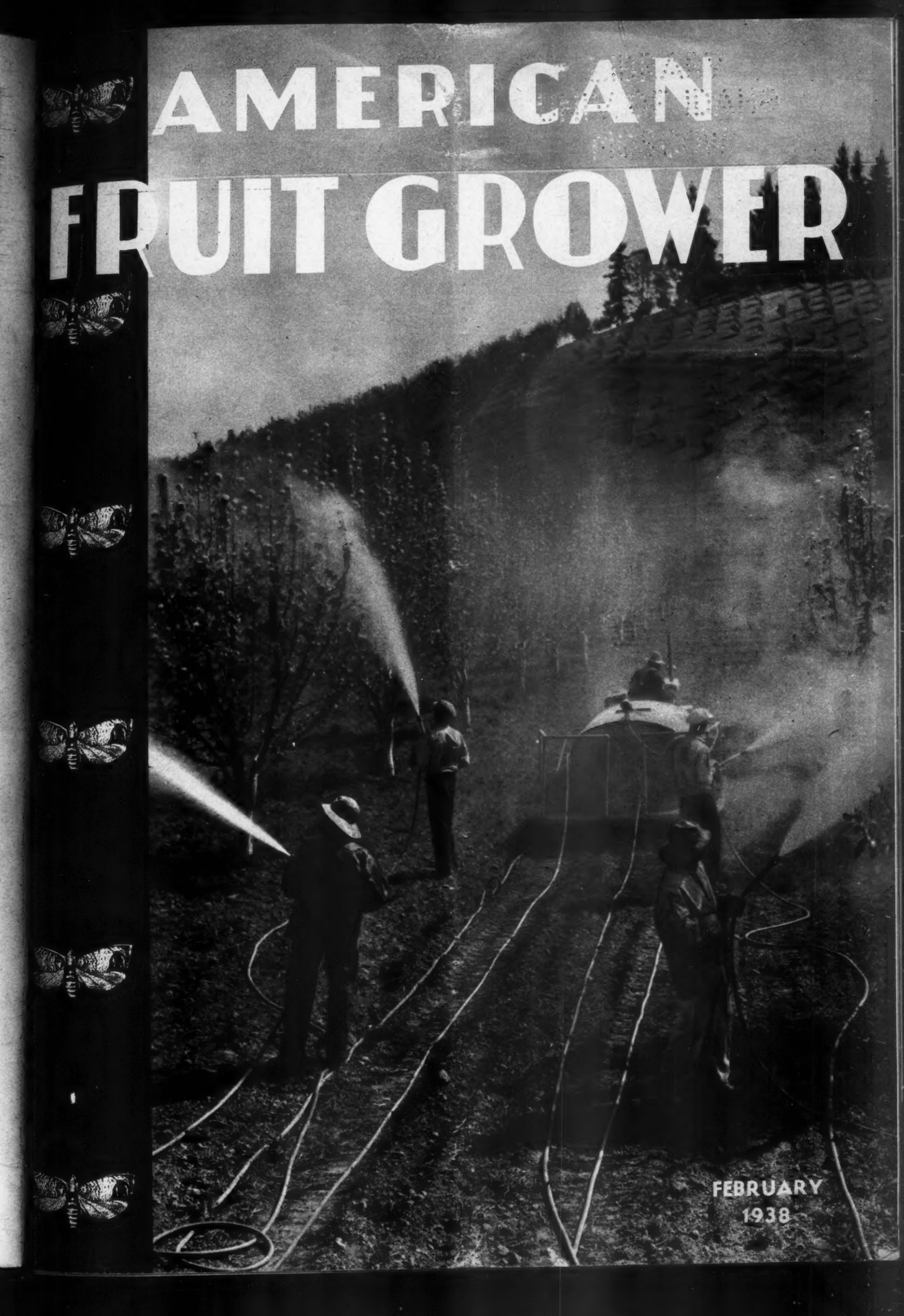
AMERICAN FRUIT GROWER



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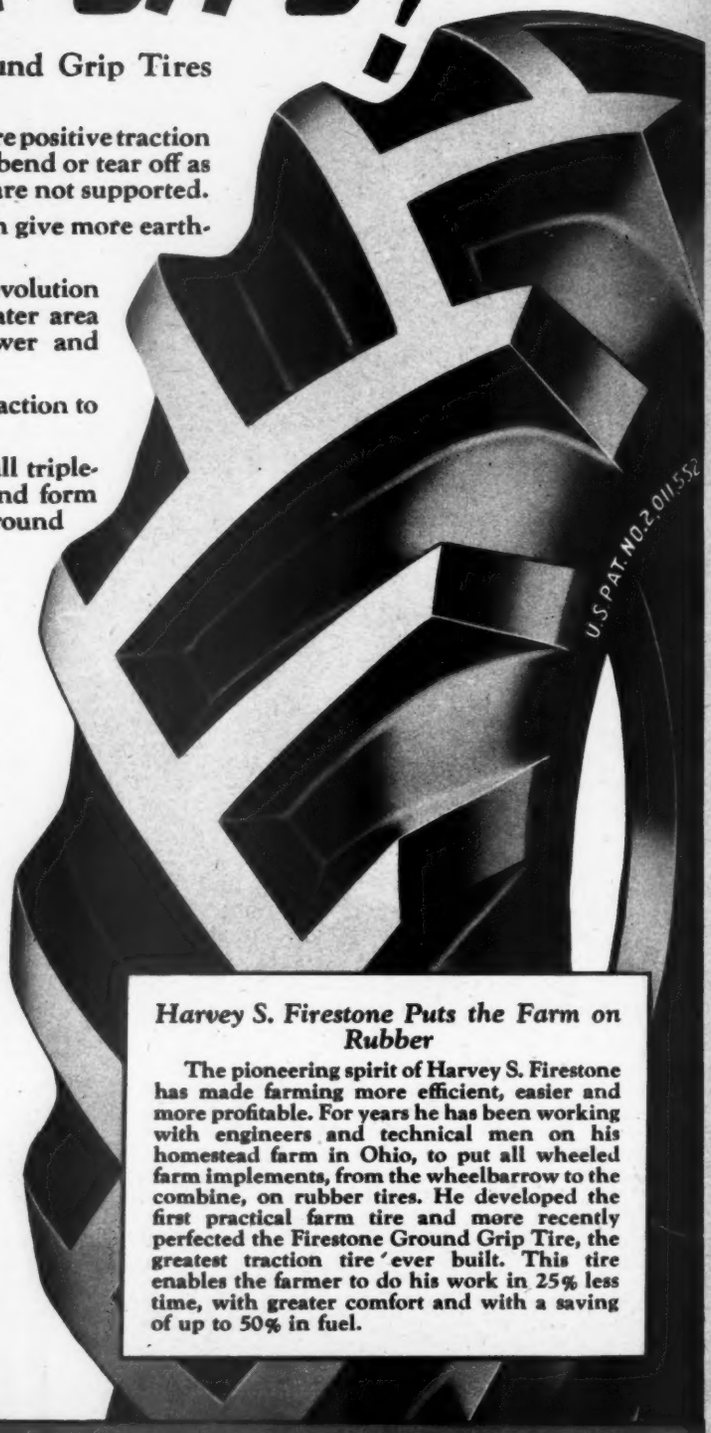

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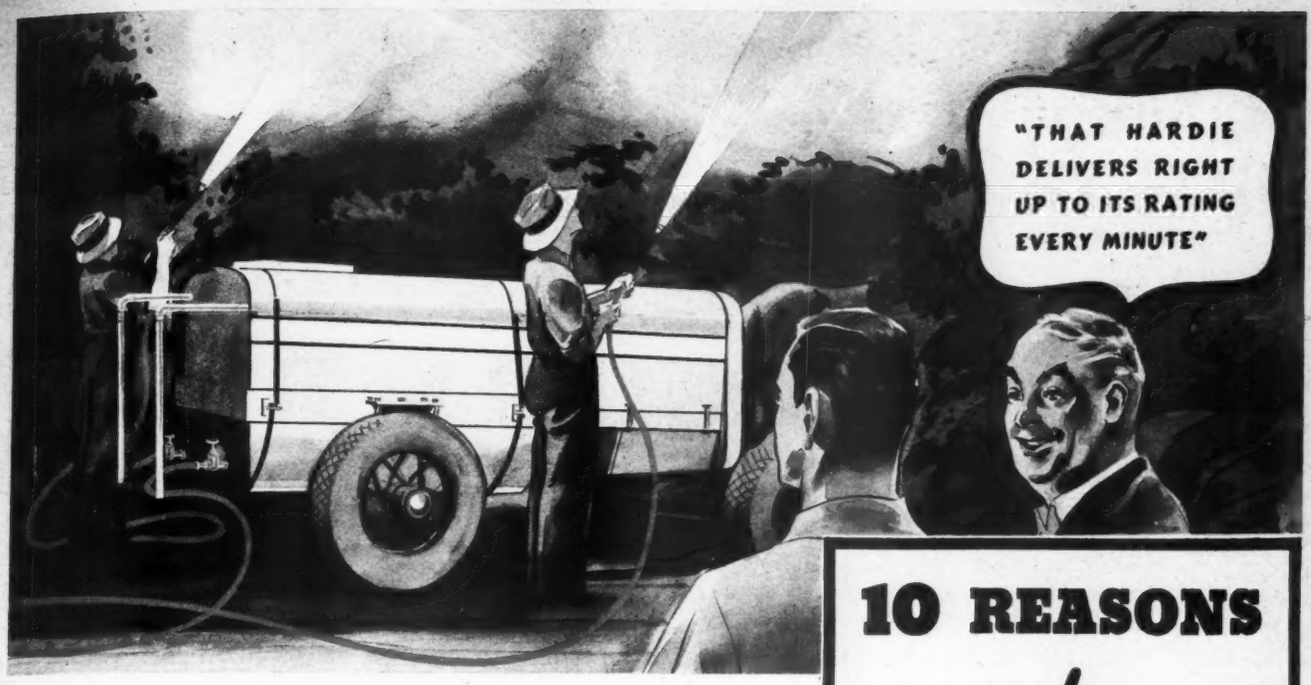

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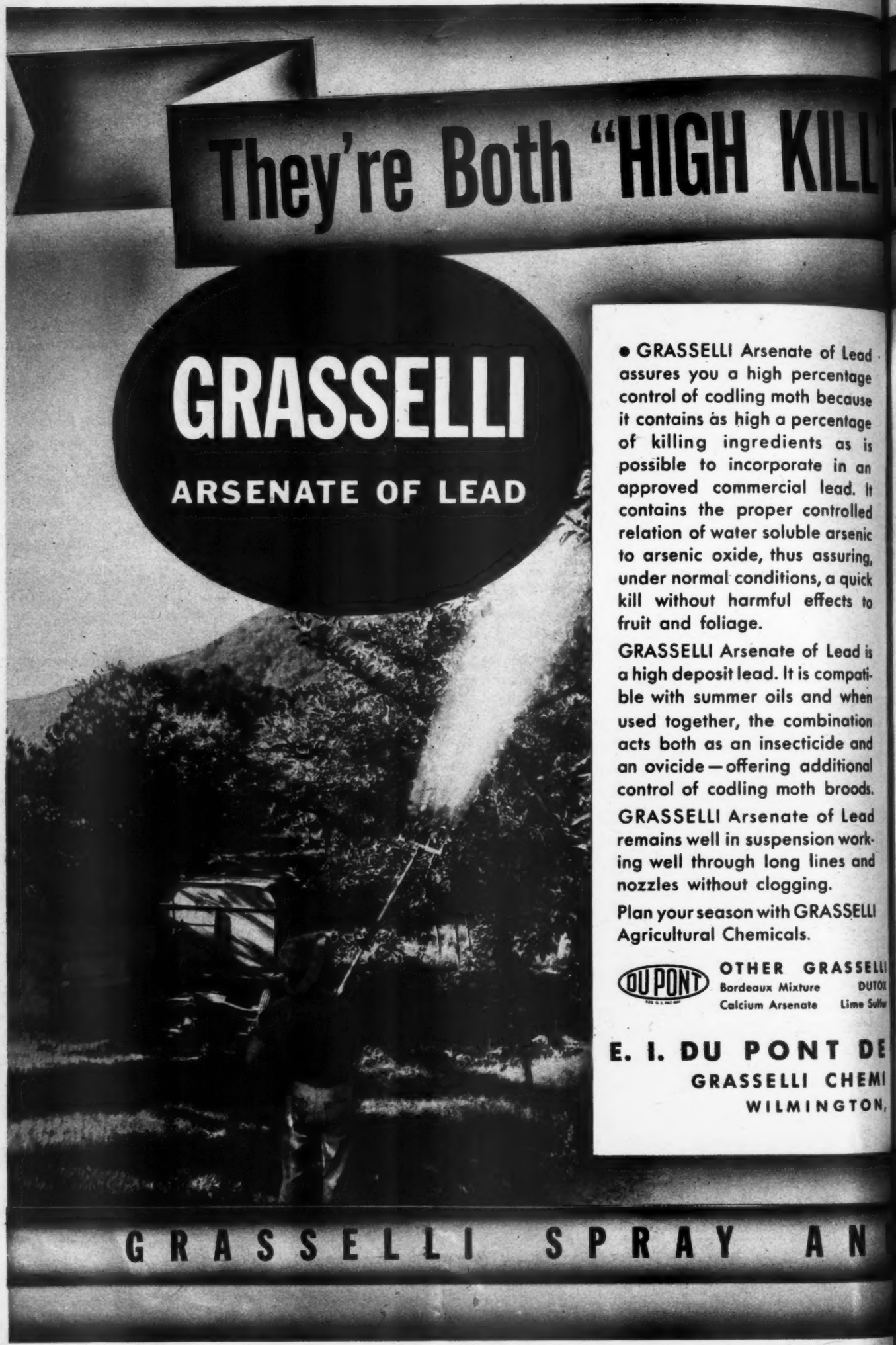
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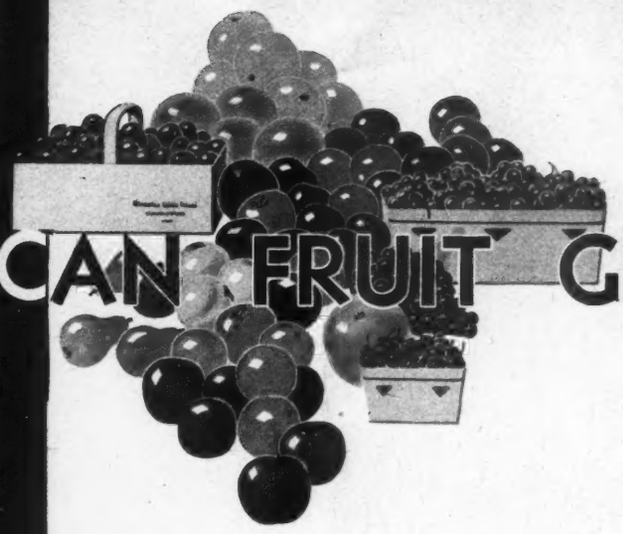

AMERICAN FRUIT GROWER

The
NATIONAL FRUIT MAGAZINE

CONTENTS

"It's the Man Behind the Spray Gun" 9
By Frank H. Beach

The 7 Ages of an Apple 10-11

Codling Moth a Pest of Stone Fruits in California and South Africa 12
By Ralph H. Smith

Codling Moth and Apple Production 13
By Leroy Childs

Important Raspberry Insects and Diseases 14

New Nicotine Codling Moth Program 15
By J. M. Merritt

The Camera "Covers" the New York State Meeting 16

Orchard Pest Review 18

American Pomological Society 22
A Page Conducted in the Interests of the Society

State News 24

Chromosomes of Nut Trees 36

New Time and Money Savers 37
By Handy Andy

Successful Orchards 38
A "Round Table" Page for Every Grower

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THIS GAME OF SPRAYING

ONE of the most important items in cost accounts of fruit farms is spray material. Since such a great percentage of the actual monetary expenditure on a fruit farm goes for spray material, and such a vast amount of time and work are necessary for its application, there should be an understanding of just what constitutes a good spray material.

First of all, it must be toxic, or death dealing, to the insects or diseases for which it is intended. Fortunately, most of our spray materials are effective against groups of pests, but this point brings out the need for recognition of the sphere of the material. Too great a territory of pest control may be claimed for a spray chemical. There is sound basis for the contention that all growers should know what kind of materials they are using and what pests they are endeavoring to control.

Next in importance is the effect of the chemical on the trees or plants. No spray will have a successful career in the fruit industry if its action results in death or injury to plants. Spraying is done to protect plants, not to harm them.

Since most spray programs call for the use of several chemicals in combination, for control of one or more pests at the same time, the compatability of the chemical often accounts for its acceptance or rejection by the industry. Compatability, without injury to plants or equipment, must be determined before a spray chemical is used.

"It would be wonderful," say many fruit growers, "if suitable sprays could be applied every day so that pests could be held practically 100 per cent under control." The only alternative to such a Utopian condition at present is the use of chemicals which will adhere to foliage and fruit between spray applications.

Spraymen claim that the next important characteristic of a spray material is its effect on the user. It is the "man behind the gun" who suffers when a spray material causes physical irritation. It is true that precautions can be taken if only mild irritation is expected, but if irritation reaches an injurious stage, the material is at fault.

Best results from spraying are obtained when equipment is in prime condition, and no factor is so important in spray equipment operation as the use of non-abrasive spray material. Grit in spray chemicals or extreme coarseness of particles will wreck sprayers, hose, and nozzles.

Last, but in the case of the fruit farm account book, not least, is the matter of spray material costs. Here, as in many other lines, cost is not the only factor to consider. Spray material that will not do the work is by far the most expensive, even though its unit price may be considerably below the better grades of material. This game of spraying has reached a point where only the growers who follow a rigid pest control program will obtain returns of such extent as to warrant the continued operation of their orchards. This past season illustrated better than mere words the folly of indifference to new and better spraying chemicals and equipment.

Fortunately, manufacturers of spray materials have given the fruit industry products that will live up to the characteristics outlined above. It is up to growers to use these materials intelligently if they want to obtain the best possible results.

Speed, Power, and Economy

Above: Eighty boxes of lemons loaded for market, pulled by a McCormick-Deering Model O-12 Tractor and Tractor Trailer owned by S. H. Toll, Santa Paula, Calif.

McCORMICK-DEERING Model O-12 Tractor

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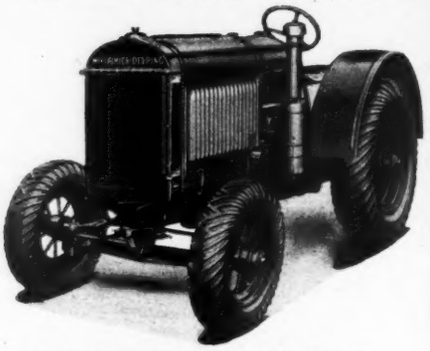
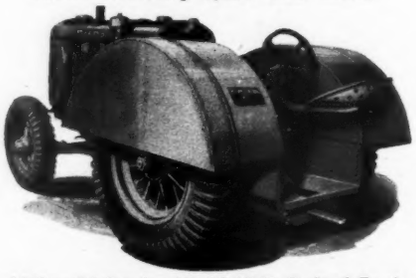


McCormick-Deering Model 10-20 Tractor



McCormick-Deering Model W-30 Orchard Tractor

McCormick-Deering Model T-20 TracTracTor at work among fruit trees

McCORMICK-DEERING

"IT'S THE MAN BEHIND THE SPRAY GUN"

By FRANK H. BEACH
Extension Horticulturist
Ohio State University

Those who remember Spanish-American war days will also remember a popular song-poem of that period entitled, "The Men Behind the Gun." This article on spraying technique will therefore stir the memories of many fruit growers, for the author in a most practical way points out that success in spraying operations depends by and large on "the man behind the gun." He tells why, and the points he makes, as well as the pointers he gives, will prove valuable to growers.—EDITOR.

THE most important factor in getting a spraying job well done has been and will continue to be the sprayman himself. The man behind the spray gun is even more important than the machinery, equipment, or formulas used. He must start each needed application on time, finish on time, and use equipment and methods skillfully so that each tree is thoroughly sprayed, inside and out, top to bottom, with finely broken spray fog, applied to give safe, uniform coverage. There is no substitute for a skillful, alert, thorough-working sprayman.

It is relatively easy to do a good job of spraying with small trees. With trees taller than 15 feet, the tops, and especially the top centers, are difficult to cover. It is rare to find a sprayman giving thorough coverage to the upper third and top center of trees 20 feet or higher. Scab and worms too often tell the sad story of failure to spray thoroughly the upper third of the tree.

During the past few years I have put on a number of spray application demonstrations in most of the important fruit counties of Ohio in cooperation with the county agents and interested growers. The object of these demonstrations has been to improve the spray job by demonstrating machinery and nozzle equipment, and showing various methods of application so that the growers could see and appreciate the various factors that interrelate in getting a good job done.

The safety of spray fog was demonstrated by spraying against a specially designed target over which a paper had been stretched which tore out of the frame when the spray pattern was such that it favored mechanical injury. This demonstration showed growers a safe spray fog to reduce mechanical injury and acquainted them with the distance from the target and type of spray that were associated with least injury.

Prior to the demonstrations, a large number of brown or black sponge rubber ball targets were hung in typical trees to be sprayed. These were quickly prepared from inexpensive sponge rubber balls, two to three inches in diameter, into which had been stuck a short wire curved to make a hook so that the targets could be hung over small limbs. The targets were placed at the top, center, and at various points throughout the tree.

After various spray methods were demonstrated and the spray had opportunity to dry, the targets were removed, to show the type of coverage secured in different parts of the tree. The targets told an interesting story. They showed how difficult it was to get a good job of spraying in the interior of large trees and in the top center of mature trees. They also served to indicate which methods of applying sprays worked best. Any grower can use this convenient, inexpensive check-up to study the coverage he is getting in his own orchard.

A spray job requires that a certain number of gallons be delivered on the trees within a definite time limit. Provided the applications are thoroughly applied, no other factor is as closely tied up with a good job as putting on the right number of gallons per tree. At the Ohio Agricultural Experiment Station, records kept over a number of years indicate the following needs for trees of various kinds and age groups.

Amount of Spray Material Required for One Application

Age of Tree	*Apples*	*Peaches*	*Cherries*
2-3 Years	.5 gal.	.7 gal.	
5 "	1.5 "	3.0 "	
10 "	6 "	5.4 "	
12 "	8 "		
15-20 "	10-16 "		7 gal.
21-35 "	16-30 "		

Multiple cluster nozzles or fog drive brooms may not place enough spray material in the tops, which usually can be covered best with single or double-nozzle spray guns. A tower on the rig is often needed to do a good job on tree tops when spraying from a moving machine. The tops of any trees too tall to spray thoroughly should be lowered.

Spray fog must be driven over the tops of mature trees to cover the top center. To secure this the sprayman must carry the up stroke high enough to see the top of the tree below the spray fog drive. Timely, speedy

(Continued on page 31)

THE 7 AGES OF A

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NATURE'S saga of regeneration, as applied to the apple, has been transferred to the printed page through these illustrations. Fundamental developments —from bursting of the bud to the mature fruit—graphically portray the debt of fruit growers to nature and her wonders. Of paramount practical importance is recognition of the stages of apple growth for timing of spray applications. Such development and growth as shown here would be impossible without protection against tissue-destroying insects and diseases. But without proper timing, knowledge of spray technique, effectiveness of spray chemicals, and efficiency of spray equipment are lost. Clip and post these pages on office or workroom walls. The 7 AGES are authentic guides for timely spraying.

1 New life begins with the breaking bud. This is the delayed dormant stage when important sprays to catch early infections of scab and to control aphis, curculio, and bud moth are made. Contained in the developing buds are flower parts and leaves. Buds shown are borne at the end of fruit spurs.

2 Well along in the pre-pink stage, the buds push their way forward after unfolding of the leaves. During this period continued spraying must be carried on for protection against scab and insect pests. Details brought out by this illustration show the tenderness of the new growth.

3 First signs of approaching bloom appear in the pink stage. This is a critical period in the spray schedule for scab control. Best results are obtained when the pink spray is started as soon as buds have separated in the clusters and completed before the blossoms open. Besides scab, curculio and other chewing insects are controlled at this time.

4 Blossom time. In this most important stage, the pollination of the exposed stigmas occurs. Since most pollination is carried on by bees, it is necessary that no spraying be done during this period. If lead arsenate is used after the blossoms open, bees may be poisoned and pollination reduced.

5 Petals have fallen and the new fruit starts to develop. This is known as the petal-fall or calyx stage. Spraying should not be started until all of the petals have fallen and there are no bees working in the trees. Spraying at this time will determine to a large extent the control of first brood codling moth, key to success in suppression of this important pest. While start of this spray must be made only after pollination is complete, it is advisable to finish the spraying as rapidly as possible to cut down early worm entry.

6 The new fruit takes form. During development toward the mature fruit there is relatively rapid growth. This necessitates careful spray applications to maintain as complete coverage as possible. The number of cover sprays varies according to severity of insect attack, and advice for specific localities is available from State experiment stations.

7 A finished product. Through six AGES, each presenting hazards in development and growth, have come these apples. A thousand factors enter into the successful production of high quality apples. To the grower, a quality crop means material gain as well as a feeling of accomplishment—a satisfaction gained through aiding nature.

APPLE

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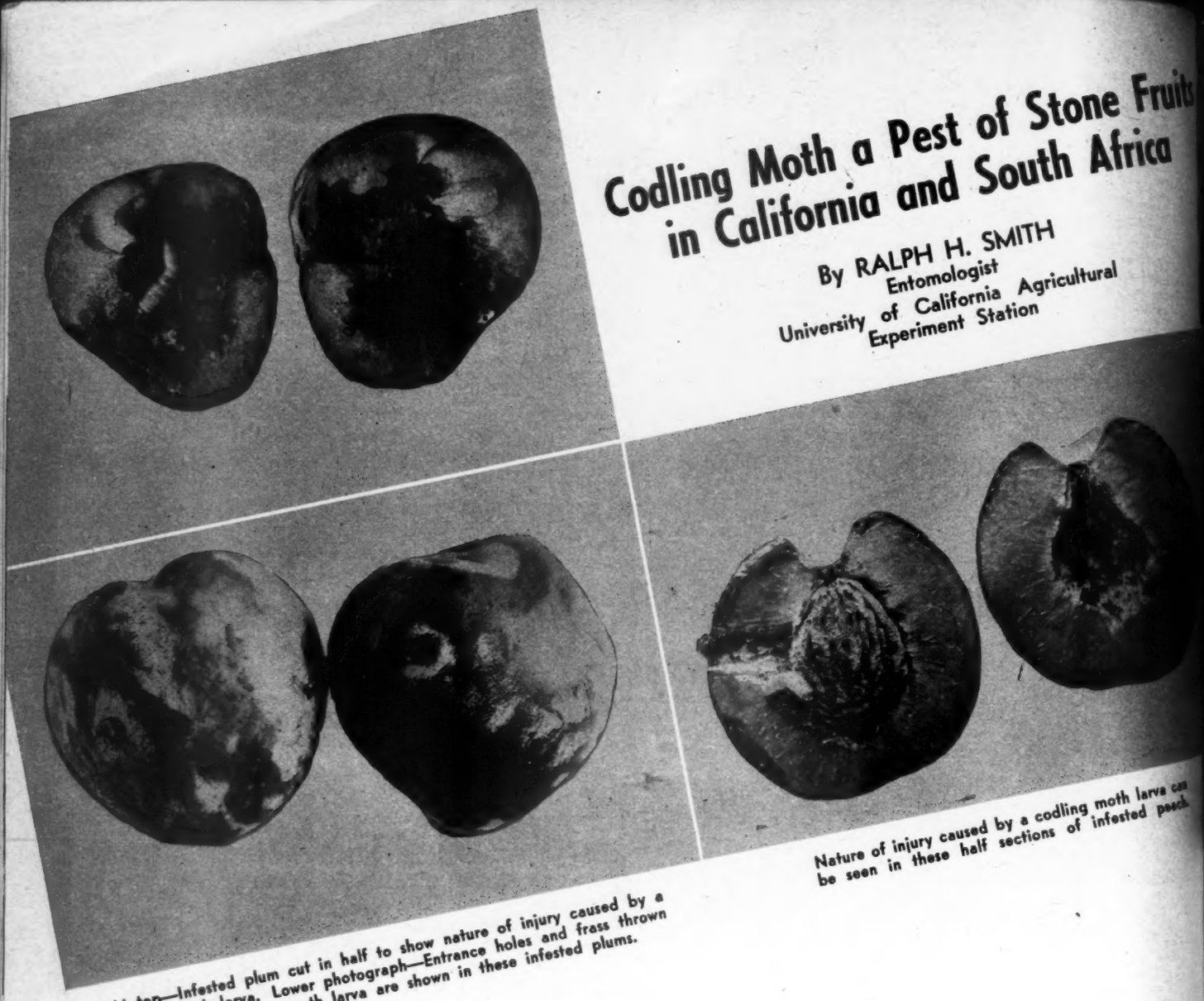
This series of photographs by Black Star.

7

Codling Moth a Pest of Stone Fruits in California and South Africa

By RALPH H. SMITH
Entomologist
University of California Agricultural Experiment Station



At top—Infested plum cut in half to show nature of injury caused by a codling moth larva. Lower photograph—Entrance holes and frass thrown out by a codling moth larva are shown in these infested plums.

Nature of injury caused by a codling moth larva can be seen in these half sections of infested peach.

MANY instances of the codling moth attacking stone fruits have been reported from various parts of the world during the past 75 years, but only within the past 10 years has this age-long enemy of apples and pears established itself as a primary pest of stone fruits in certain regions.

Several questions have arisen in connection with this new status of an old pest. Has the insect through the passing decades gradually become adapted to an existence on stone fruits, or has a special strain come into existence through the phenomenon of mutation? Is there danger that the apricot or plum strain may spread from its present habitats and become destructive to these fruits in all regions where they are grown? Has the adaptation to stone fruits arisen through ecological conditions peculiar to certain regions and will the insect maintain itself on these fruits only where such conditions exist?

If correct answers could be given to these questions, we should be able to predict whether or not orchardists 50 or 100 years hence will be obliged to protect stone fruits against this insect as they now protect apples and pears.

In 1859 Jaeger, an early American entomologist, stated that codling moth larvae are "often found in apples, pears, plums and apricots." In 1872 Riley, State entomologist of Missouri, stated that he had seen peaches infested by the codling moth. In 1883 Cooke, the father of economic entomology in California, stated, "That the codling moth infests the peach and the apricot, I have abundant proof by rearing moths from both kinds of fruits."

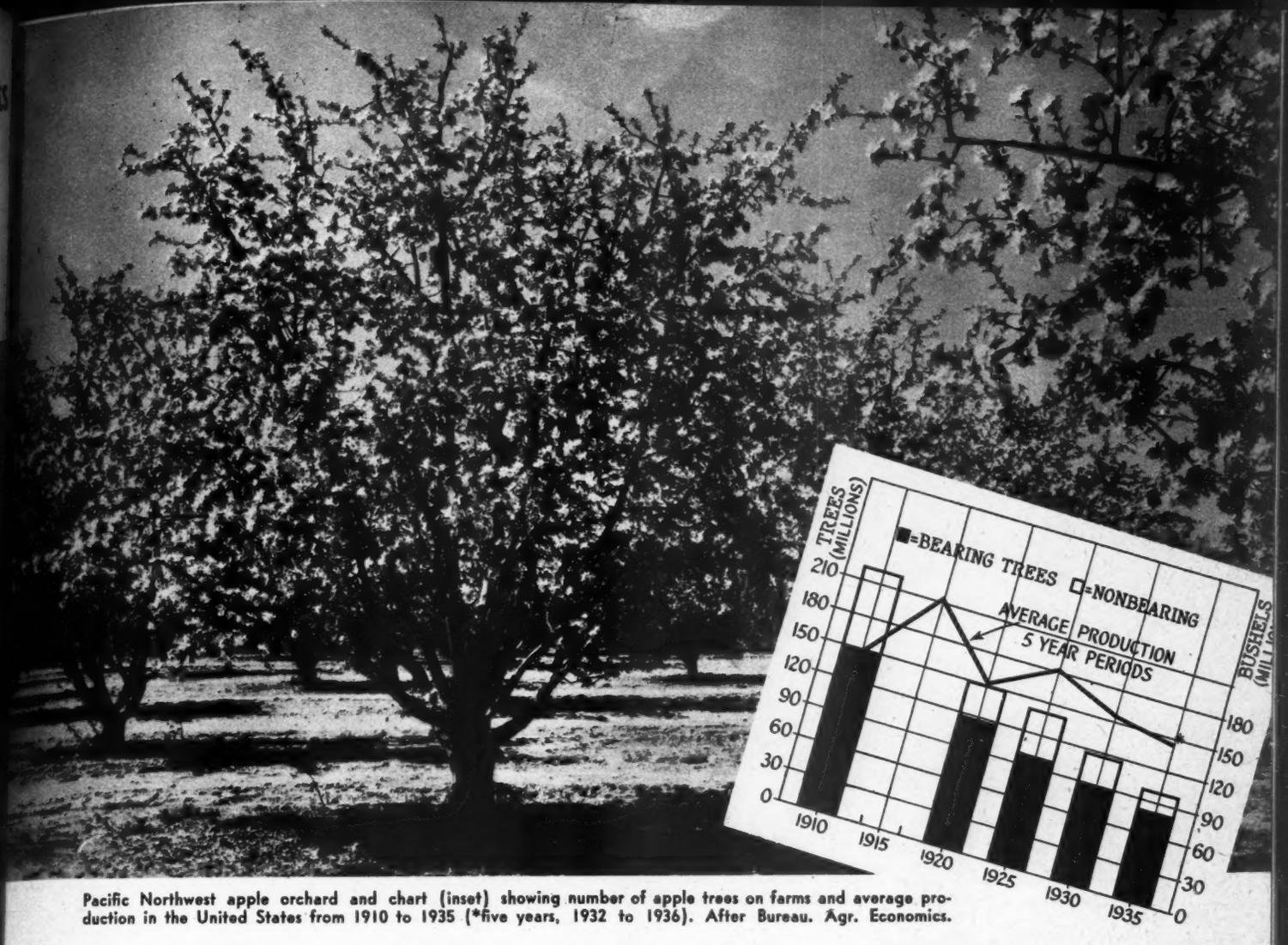
In 1891 French, well-known entomologist of Australia, said that the codling moth "has of late years turned its attention to apricots, and in rare cases even to plums and peaches." In 1898 Lounsbury, eminent entomologist of South Africa, stated that "apricots and peaches are sometimes attacked, a fact observed in this country as well as elsewhere." More recently List and Yetter in 1927 stated that in the Grand Valley, Colorado, there is a general and sometimes serious infestation of plums, prunes, and apricots, while peaches and cherries are attacked to a lesser extent.

In all these records, the infestations on stone fruits were presumably caused by moths which flew from nearby apple and pear trees and erratically laid eggs on the stone fruits.

The first record of the maintenance of the codling moth on stone fruits independently of its principal hosts, apples and pears, was by Pettey in South Africa, in 1925. He reported that at Wellington, South Africa, the codling moth had been maintaining its existence in apricot orchards a half mile or more distant from its usual host plants, and had been causing serious loss in many orchards to apricots, and to Kelsey and Wickson plums. The infestation in apricot orchards where no control measures were practiced averaged between 10 and 15 per cent. In a few orchards 30 per cent of the fruit was infested.

Investigations subsequently reported led to the conclusion that the codling moth was able to maintain itself in apricot orchards from year to year because a large majority of the first

(Continued on page 27)



Pacific Northwest apple orchard and chart (inset) showing number of apple trees on farms and average production in the United States from 1910 to 1935 (*five years, 1932 to 1936). After Bureau. Agr. Economics.

CODLING MOTH AND APPLE PRODUCTION

By LEROY CHILDS
Superintendent
Hood River (Ore.) Experiment Station

THE codling moth has demonstrated itself as being an efficient and capable insect. During the past 60 years it has met and survived the onslaughts of the American scientists and the earnest combat of the apple and pear grower with a high degree of success. During this lengthy period engineers have vastly improved the mechanics of spraying; chemists have devised more and better poisons for insect destruction, and the entomologist has added much to the more complete understanding of the life history, habits, and control of the pest. Yet, with all this endeavor, the codling moth takes an annual toll in labor, fruit loss, insecticides, equipment maintenance, and depreciation, amounting to many millions of dollars.

Looking at the problem from the standpoint of economics and the good of the apple industry as a whole, it is perhaps well that we have efficient little insects like the codling moth, the various plant lice, apple scab, and apple cankers to keep the industry in check and on a fairly sound economic basis. If these insect and plant disease associations of ours were not continually active, there would be no need for a commercial industry. Apples can be grown in practically every state in the Union. With no pests to hinder production, every lot in the city and every small and large farm in the country would have its apple trees and plenty of good fruit for home and local consumption.

It is paradoxical that our insect and disease enemies are, in reality, friends of the efficient grower who is making a business of apple production. From a production standpoint, the efficient grower need give little concern to the back yard apple tree or the marginal or inefficient grower. The codling moth will take care of this type of producer. Crops from these sources may, at times, offer competition in a limited way; this, for the most part, in the form of low grade, inferior fruit. The competent grower, however, is damaged more than he realizes on account of the perpetuation of insect population on neglected trees.

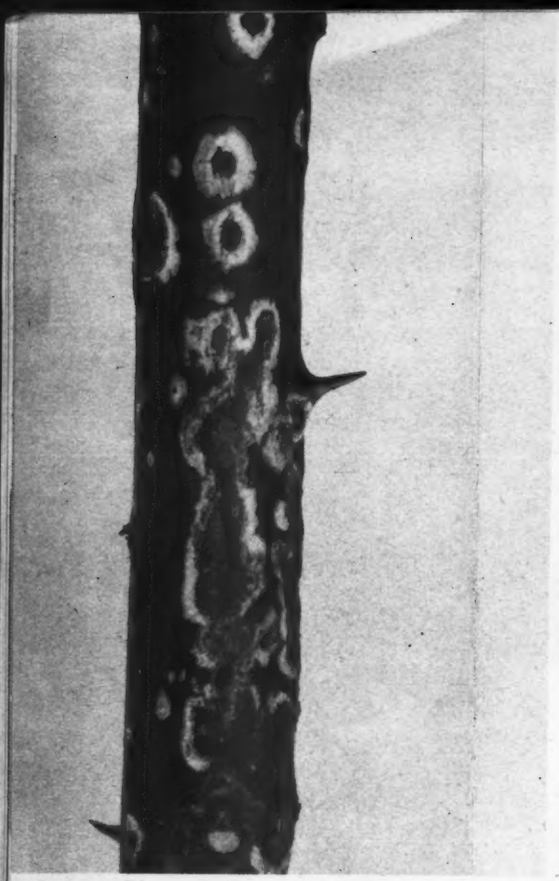
An interesting diagram recently appeared in a publication of the Bureau of Agricultural Economics, U.S.D.A. It demonstrates the influence insects such as the codling moth, diseases of various types, and neglect have exerted on the apple tree population of the United States during recent years. This graph is reproduced above.

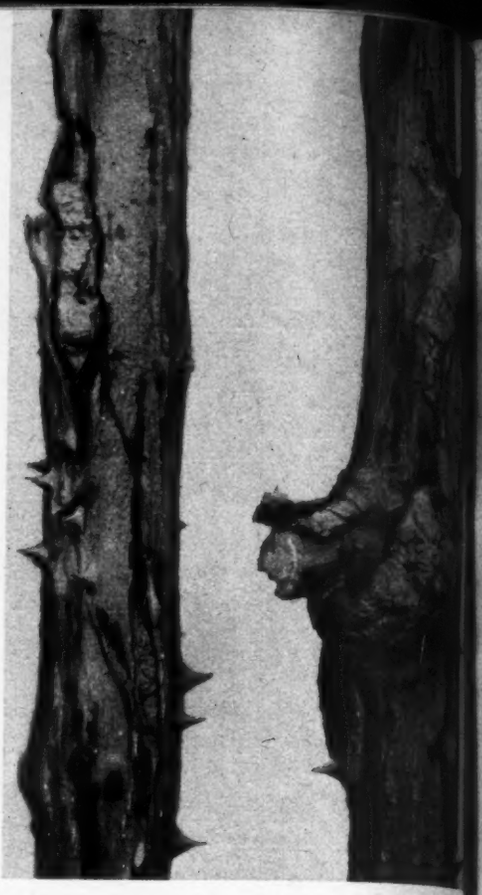
In 1910 there were, roughly, 150,000,000 bearing apple trees in the United States, producing approximately 150,000,000 bushels of apples. In 1936 the number of bearing apple trees was found to be approximately 80,000,000. This is a loss of 70,000,000 trees—a reduction in total number of bearing trees of 46 per cent in 25 years.

The production loss, however, has not kept pace with the tree loss. The five-year average production observed in 1910 was found to be about 150,000,000 bushels; in 1935 the five-year average yield, with 70,000,000 fewer trees, amounted to approximately 140,000,000 bushels. In other words, growers at the present time are producing nearly as many apples as they were able to grow on twice the number of trees a quarter of a century earlier.

What has brought about the change in the apple picture? This is

(Continued on page 28)





Left—A severe infection of anthracnose on raspberry cane. Above—Cuthbert raspberry leaflets mottled by mosaic disease. Right—Raspberry canes infected with crown gall.

IMPORTANT RASPBERRY INSECTS AND DISEASES

A healthy raspberry plantation means a profitable plantation. The important insects and diseases attacking raspberries, together with control measures, are therefore covered in this article, abstracted from an address by Dr. A. S. Colby of the University of Illinois before the recent American Pomological Society convention in Springfield, Mo. Dr. Colby, author of a number of bulletins on brambles, has gained nation-wide prominence because of his work on these fruits.

THE most common and serious fungous disease of the black raspberry—found in recent years also on red raspberries—is anthracnose. It can be kept under commercial control by following a program of sanitation and spraying with winter strength lime-sulphur as the buds open in spring.

Crown gall, a bacterial disease common on many kinds of plants, is especially damaging to rasperries, although it is not reported to be as bad in some sections—New York, for example—as in others. Root galls, in the immature stage, are not noticed on nursery stock and show up in the planting after a year or more. There are few practicable control measures, except the planting of gall-free stock in gall-free soil.

At Illinois we root pruned raspberry plants during the growing season with a tiling spade, describing circles either six or 12 inches from the plant crowns. When these plants were dug the following November, we found that in some cases the two severed portions of the roots had grown together, in others no union had occurred but new rootlets had started from the cut ends. In every case where a root had been injured, whether or not the two portions had again joined, a gall was found. These were identified by Dr. A. J. Riker, of Wisconsin, as crown gall. Evidently the bacteria were in the soil, but no evidence of the disease was found on the roots of these plants unless they had been injured.

This fact has an important bearing upon root injury from deep cultivation and the spread of grown gall, known to be disseminated by soil water. Mulching raspberry plantations in the rows and cultivating as shallow as possible between the rows should help prevent gall damage. Such precautions, however, may not always be adequate, since it has been found at the Wisconsin Experiment Station that root injuries caused by white grubs and other root-feeding insects may cause infection when crown gall bacteria are present in the soil.

A third group of diseases of great importance, but not thoroughly understood, is known as virus diseases. While their cause has not yet been definitely determined, we do know that the agents are ultra-microscopic in size and are transmitted by insects. Since the organisms causing the diseases have not been isolated and studied, it is necessary to depend upon symptoms on the plants to differentiate them. However, these symptoms are often masked by different weather conditions. Other factors, such as mildew, leaf spots, and mites, may cause injuries which closely resemble disease symptoms and make it difficult to diagnose the trouble.

The most common virus diseases are known by the more or less descriptive terms "leaf curl," characterized by the cupping of the leaves; "mosaics," showing various types of mottling; and "streak," the chief symptom of which is a purple streaking of the cane. Leaf curl and mosaic are transmitted by certain plant lice. It is not certain whether an insect is responsible for the spread of streak.

Control measures are being worked out as more knowledge of the diseases is secured. The first step is to obtain disease-free plantings from which stock may be purchased for setting. Rigidly inspected mother-nurseries are being used for this purpose. In this work the co-operative efforts of the nursery inspection service, the experiment stations, the nurseries, and commercial growers are essential.

The second step is the breeding of resistant varieties, which are suitable for commercial use. It is interesting in this connection to learn that seedlings of Lloyd George crossed with Cuthbert have been originated at the

(Continued on page 34)

New Nicotine

CODLING MOTH PROGRAM

By J. M. MERRITT

NICOTINE has a 40-year past as an insecticide, a very real present, and a future. Entomologists have found many effective ways to use it, most of which are still employed. Forty years of "contact effect" of nicotine has taken its toll of all those insidious sap-feeders that leave no conspicuous blemish, only dwarfed and misshapen fruit, and left its impression on many spray calendars.

The fact remains that if all the insects but one were killed—the infamous codling moth—no bumper apple crops would be produced. So what of this, the premier problem? How is nicotine being discussed in this connection at the meetings of fruit growers and entomologists?

Now, more than ever before, nicotine and codling moth are being discussed together. When lead, arsenic and fluorine tolerances were first established, nicotine and a host of other materials were tested as substitutes. Entomologists found that nicotine killed mature eggs; that it killed all the young larvae and most of the moths that it reached; but their chief concern was to control and effectively distribute its volatile contact action.

The codling moth population of an orchard is too wary to be controlled by one application; spray barriers must be maintained to stop the entrance of the hatching larvae. The familiar nicotine sulphate and summer oil combination holds the nicotine in a toxic film and releases it slowly. The contact action is still there, and also the barrier effect. This has been developed for some time, and widely used; its desirable features are now incorporated in a new material capable of still greater service to the fruit growers.

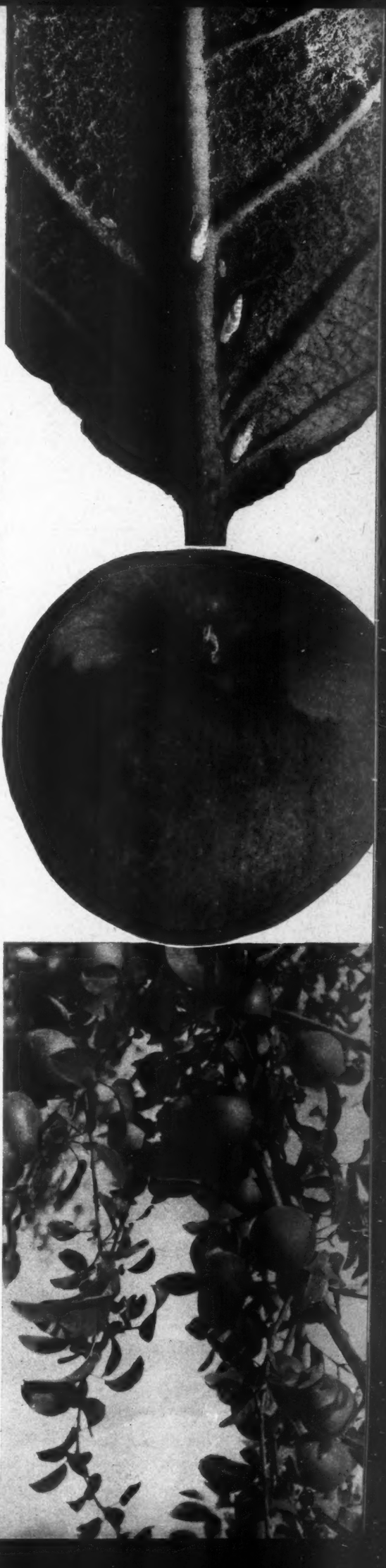
The new material is insoluble nicotine, called "fixed nicotine." Chemists and entomologists have developed it during the last eight years. During that time exacting experimental work guided its development and demonstrated its effectiveness, and last year growers in the Middle West, and in the East, found it capable and dependable under a wide variety of conditions. Thus the use of insoluble and non-volatile nicotine in the codling moth spray program is based on all the previous experiences, yet meeting the present requirements for control.

Present requirements—that means a lot of other things that are discussed at fruit meetings: sprays that can build the barrier as strong as necessary, but without harmful residues; non-caustic sprays that save the foliage; and spray programs that mean not only codling moth control, but more clean, marketable fruit. In orcharding, success has become more profitable, failure more costly. Methods, and materials, that contribute to success are being developed, so nicotine has progressed from a substitute to an alternative control.

Sprays are combinations of insecticides, used to attain a desired control. Their essential value, regardless of what is in the tank, is what they put on the fruit; and the "load" on the fruit that works here may fail there, all because conditions vary tremendously. So growers in each area spray "as necessary," use, for example, two, three or four pounds of lead arsenate. But bricks, without mortar, can be piled only so high. So with lead arsenate mortar is used to pile it higher, in the form of oil or deposit-builders.

Nicotine and summer oil have definite limits in this connection, but that is where insoluble nicotines have their place. With "Black Leaf 155" or bentonite-nicotine as bricks, and oil or deposit-builders to help, entomologists and growers have a way to get that high degree of control of heavy infestations with nicotine as well as with lead arsenate. With a

(Continued on page 26)



White apple leafhopper nymphs, enlarged four times (right, top). Courtesy Connecticut Experiment Station. A spray program that not only controls codling moth but results in more clean, marketable fruit, such as the single specimen and the clusters at the right, will contribute to the success of the grower.

NEW YORK STATE MEETING . . .

George A. Morse, Williamson, left, takes over his duties as the 1938 president of the New York Horticultural Society and receives a meeting announcement from C. S. Wilson, Hall.

F. E. Gladwin, left, director of the New York Vineyard Laboratory at Fredonia and well-known grape authority, chats with L. Tanner of Medina at the educational display of the meeting.

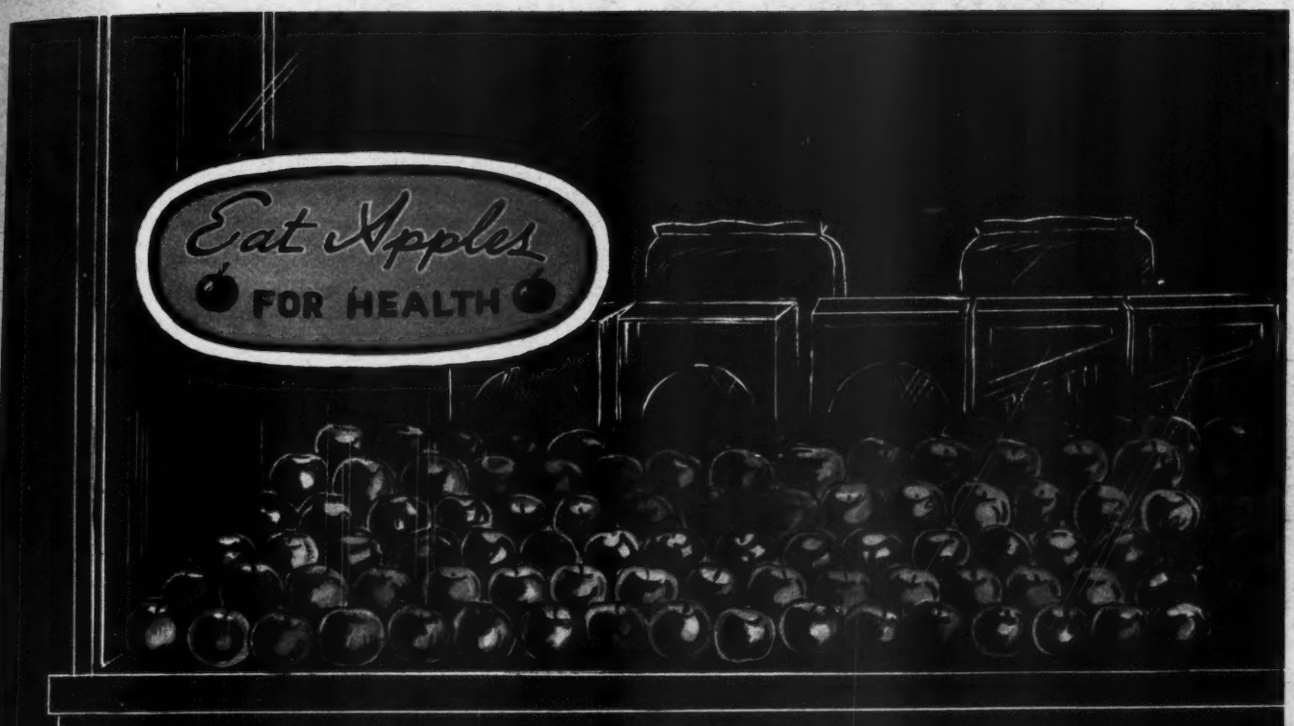
Visitors to the meeting were AMERICAN FRUIT GROWER authors C. C. Taylor, (left), Albion, Mich., and Dr. J. M. Merritt, Louisville, Ky. They are inspecting a graft sample made in the New York style.

Above—John Sawyer, Reading, Mass., left, discusses horses at a fruit meeting with W. R. Tousey, Waterport, N. Y., center, and Don Sanford, Midland, Mich., equine enthusiast, while resting between visits to exhibition booths.

Below—W. C. Knapp, Greece, N. Y., looks over some of the new apple packages prominently displayed at the meeting.

Below—Raymond E. McQueen, Wolcott, right, and Fred Thomas, North Rose, discover that the gilded exhibition sprayer really is a complete outfit with motor and pump, ready for any spraying operation.

Below—Dr. D. K. Tressler, head of the New York Agricultural Experiment Station Department of Chemistry, looks over some of the apple by-products now being produced commercially by canning factories in New York State.



"Show Window" Apples—or Culls?

● Only apples that have been properly sprayed have the quality to appeal to the buying public. Your profit depends upon quantity and quality of your crop.

"Black Leaf 40" Kills Aphis and Other Insects

By contact and fumes, "Black Leaf 40" kills aphis, red-bug, leaf-hopper—insects which injure the leaves, dwarf and gnarl the fruit.

Mix "Black Leaf 40" with your delayed dormant spray—thus cutting down costs. The use of "Black Leaf 40" in this spray, combined with Lead Arsenate and Lime-Sulphurs is to control scab, bud-moth and the principal sucking insects.

Look for the Leaf on the Package

"Black Leaf 40"

3823

TOBACCO BY-PRODUCTS & CHEMICAL CORPORATION, INCORPORATED
LOUISVILLE ★ KENTUCKY

ORCHARD PEST REVIEW

CEDAR RUST

"Fruit trees in many orchards in the county are being materially devitalized by cedar rust, and already this disease has begun to affect the fruit. More serious injury may be expected if the infection is allowed to continue."

This warning, recently given members of the Adams County (Pa.) Fruit Growers Association by their president, H. M. Weigle, is applicable to many other fruit sections of the country. Cedar rust and other rust diseases of apples are becoming increasingly damaging—except in those sections where cedar trees in the vicinity of orchards have been removed.

At present there is no known spray that will control this pest when it attacks the apple. Some cases of spraying with lime-sulphur have been noted where it was impossible to remove the cedars, but control was not entirely satisfactory.

Spores of the rust disease are carried by the wind, so it is necessary to remove cedar trees within a one and one-half to three-mile radius of orchards. Distance depends on the severity of infection.

Right, top to bottom—An advanced stage of cedar rust on mature apple. Gall or cedar "apple" on red cedar in winter condition. Boric acid injury on young apple tree at New York Experiment Station. Boric acid applied by injection method. Note spiral browning of bark.

CUT ANTS

Ants of the common type are known as carriers of the black peach aphid. Honeydew secreted by aphids attracts the ants which often carry the aphids from old fruit tree roots to those of newly-planted stock.

But Texas fruit growers have been forced to cope with another branch of the ant family. This pest is the cut ant. The ants cut off leaves of trees and carry them into their underground chambers. A large colony may defoliate an entire orchard. Leaves thus transported to the colonies are chewed up, to form a manure base for tiny fungi gardens grown by the ants.

An intricate system prevails in the colonies where "soldier ants" protect the runways, "carriers" relay the leaves to the underground chambers, and the queens lay eggs for continued development of the colony.

Key to control of the ants is in the destruction of queens by use of poison gasses, cultivation, and lethal baits.

OVERLAPPING

A prominent midwestern grower experienced burning each year on a portion of his fruit. His inquiry to the State experiment station was answered by an associate horticulturist who had run across the same trouble on one of the test orchards at the station.

The reply sent the grower pointed out that when he sprayed with the wind on one side of the tree one day and then returned to go down the row on the other side at night or when the wind had quieted, there was an overlapping of the spray materials. This overlapping resulted in what was virtually a build-up of double-strength spray and burning occurred on a band through the tree centers.

INTERNAL CORK

Drought mark, corky spot, and internal cork are some of the terms that have been applied to a condition of apple fruit during drought periods. To remedy this condition, potash was first applied, but results were not entirely satisfactory. Boron, in the form of boric acid, was then tried, in the Northwest, as an injection in the trunks of trees and excellent results were obtained.

Trees in shallow, gravelly soils will usually be the first to show a lack of boron. Cherries, prunes, and other fruits have responded to the boron treatment at the Summerland Experiment Station of British Columbia. It has been determined that an eight-ounce application of boric acid or a pound of borax to the soil, for trees 20 years old or over, will be enough to last 10 years, or until deficiency symptoms appear.

New York workers tried boric acid injections by placing crystals in a half-inch hole about two inches deep in the tree. But they found that injury to bark resulted from this method of treatment under their conditions. They are now recommending that boron be supplied through the soil.

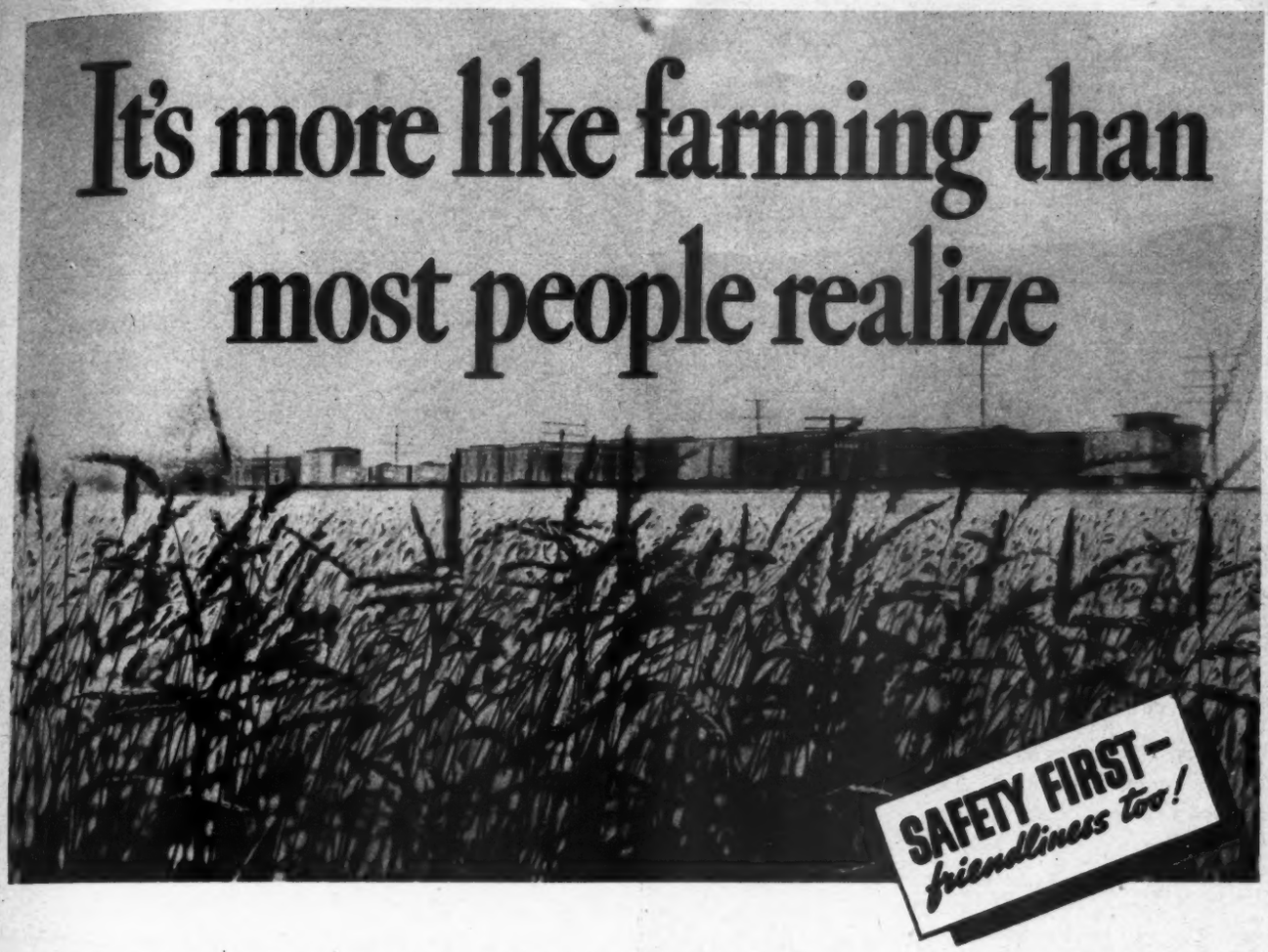
APPLE MAGGOT

Correct timing and thoroughness of application are important factors in the successful control of the apple maggot.

Dr. P. J. Chapman of the New York Agricultural Experiment Station says: "The apple maggot is controlled by poisoning the adult fly. These emerge from the soil daily over a period of eight weeks beginning June 15 to 25, depending on the season and locality. First sprays should be applied about a week after the

(Continued on page 23)

It's more like farming than most people realize



RAILROADING is like farming in a surprising number of ways. Both of us have money invested in "plant"—land, buildings, stock and machinery on farms; land, tracks, buildings and machinery on railroads. Both of us have operating expenses, for work done, for materials and supplies used. Both of us pay the same kind of local and state taxes to help support our communities.

But it goes farther than this. Without railroads to get crops to central markets mighty few farms could be successfully operated. And our 241,822 miles of line would certainly be a loss if we didn't have farmers as customers.

The point of all this is that what's bad for the railroads is bad for the farmers—and right now railroads are having difficulties which may impair the very service you need to market your products.

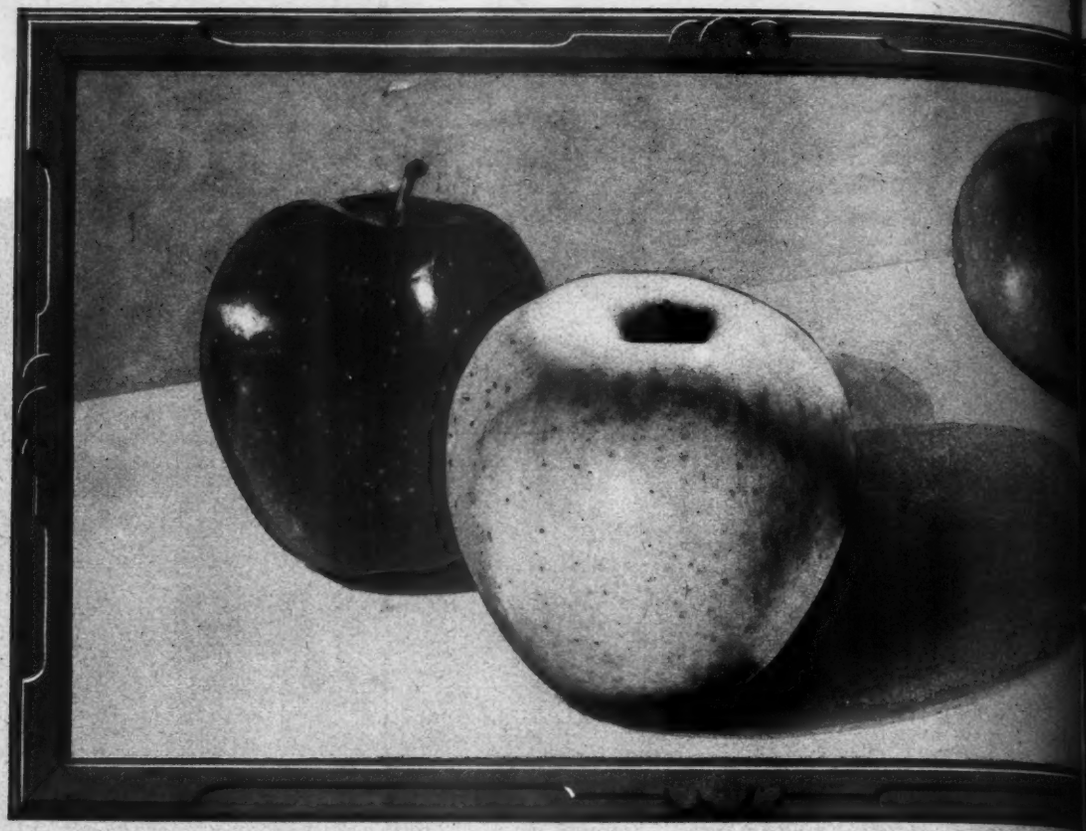
The difficulty arises out of one simple fact: Since 1933 prices of things railroads buy have gone up; wages have increased; taxes have risen — while the average level of railroad freight and passenger charges has steadily declined.

In fact, the average charge by the railroads for hauling a ton of freight one mile was actually 10 per cent less in 1937 than in 1932 —26½ per cent less than in 1921, shortly after the end of government operation, when the downward trend of rates began.

In spite of this, the railroads have speeded up their service, made it safer, more reliable, more complete — giving more for the money than ever before.

Their big problem right now is to earn enough to cover running expenses and to keep their plant in shape to continue the sort of service which you and other shippers must have.

ASSOCIATION OF
AMERICAN RAILROADS
WASHINGTON, D. C.



"Pretty enough to frame"

FINE COLOR AND FINE FINISH

Look at these apples and you will agree they are "pretty enough to frame." But if you happen to be a grower who has not yet used this new S-W Safety First Summer Spray you may ask: "How can this spray be powerful enough to guard against scab, against russeting, cause no foliage injury—yet produce A-Grade apples with the COLOR and FINISH of a school girl's complexion?"

OF COURSE, there is a secret to this Sherwin-Williams DRY LIME SULFUR with SULFIX SULFUR-WETTABLE combination, and here it is—

THE DRYING FILM OF LIME SULFUR HOLDS THE PARTICLES OF SULFIX SULFUR IN A UNIFORM, HEAVY COATING THAT IS NON-TOXIC TO FRUIT AND FOLIAGE BUT EXTREMELY PROTECTIVE AGAINST SCAB.

DRY LIME SULFUR WETTABLE

In principle it is just as simple as that—BUT it remained for Sherwin-Williams to devise this new S-W way to MAKE SULFUR WETTABLE, and to recommend it as the most effective, safe and economical of summer sprays for apples. Because Dry Lime Sulfur will WET Sulfix Sulfur quickly, practical growers everywhere have changed over to this new combination exclusively instead of gambling with old style, expensive and uncertain wettable sulfur with liquid lime sulfur.

THE SHERWIN-WILLIAMS CO.
Insecticide Department
101 Prospect Ave. Cleveland, Ohio.

SHERWIN-WILLIAMS
SPRAY AND DUST MATERIALS

rame"

ROM USING

If you want to build a reputation for producing apples of FINE COLOR and FINE FINISH, as well as enjoy the PROFITS which come from the ready sale of such fruit, plan now to change over to this new S-W Summer combination this season. Practical growers have done so and found that this combination PROTECTS against SCAB; ELIMINATES risk of RUSSETING, which always results when liquid lime sulfur is used; GUARDS against FOLIAGE INJURY. DRY LIME SULFUR is used as the wetting agent, which in itself is a most effective fungicide. It SPREADS and STICKS to fruit and foliage.

Write for FREE Folder

Before you is a special FREE folder which tells all about this combination mixes, sprays, sticks and dusts. Grow U.S. No. 1 Grade Apples of Fine Color and Fine Finish.

Which Cherries WOULD YOU PICK?

The top ones, of course, because of their FULL SIZE for CANNING, the result of using Sherwin-Williams BASI-COP in a 3-8-100 mixture. The lower row of cherries, *undersized*, is the result of copper injury to foliage following the use of 6-8-100 Bordeaux mixture in the experiments conducted under the Sherwin-Williams Fellowship established at the Michigan State Agricultural Experiment Station.

No Dwarfing of the Fruit or Injury to the Foliage *with*

The Michigan experiments proved BASI-COP to be the best of all the "fixed" copper compounds, and BETTER and SAFER than Bordeaux and Lime Sulfur in the control of cherry leaf-spot. BASI-COP is neutral and insoluble and will not dwarf cherries nor cause yellowing, dwarfing or dropping of the leaves. It is economical, too, for one pound of Sherwin-Williams BASI-COP contains a minimum of 50 per cent of metallic copper, whereas one pound of copper sulfate contains only 25 per cent. One pound of BASI-COP is therefore equal in copper content to two pounds of copper sulfate.

Write for FREE Folder

As a cherry grower you will want to know all about these latest experiments in the control of cherry leaf-spot. We have ready for you a FREE folder which shows the official photographs taken during these tests and the BENEFITS of BASI-COP. Write for your copy at once.

THE SHERWIN-WILLIAMS CO.

Insecticide Department

101 Prospect Ave. Cleveland, Ohio

SHERWIN-WILLIAMS

SPRAY AND DUST MATERIALS

APS

A PAGE CONDUCTED IN THE INTERESTS OF THE AMERICAN POMOLOGICAL SOCIETY

REPORT OF COMMITTEE ON RESOLUTIONS

THE following resolutions were presented by the committee and passed upon by members of the American Pomological Society and the Missouri State Horticultural Society in their regional horticultural meeting held in Springfield, Mo., December 8-10, 1937. These resolutions are herewith presented because they are of general interest and because they touch upon questions of national policy as they relate to horticulture. Delegates and fruit growers from Tennessee, Arkansas, Kansas, Illinois, and Iowa attended this convention and added their voice of approval to these resolutions.

The Committee on Resolutions of the American Pomological Society and the Missouri State Horticultural Society beg leave to offer the following for adoption:

1. That our secretary write to the Honorable Cordell Hull, Secretary of State, before December 15, favoring every possible consideration involving a reciprocal trade agreement with England to the end that the present English duties of approximately $1.50 per barrel of apples be reduced.

2. That our membership and our secretary write our respective Members of the House, urging defeat of the entire Black-Connery Bill, or, if that is impossible, insist that agricultural labor be entirely exempt from the provisions of the bill.

3. That we commend the activities and accomplishments of the National Apple Institute in its successful efforts to unify the various state and regional apple institutes founded for advertising and extending the use of Pomological Products in domestic and foreign markets and recommend further co-ordination of the efforts of these various agencies in developing a unified national program.

4. That we do not favor Senate Bill S-9 (69) designed to limit the length of freight trains, which is bound to result in increased freight rates.

5. That apple growers in general feel that the crop reports issued by the Department of Agriculture on predicting price levels, particularly during heavy crop years, have a detrimental influence upon the price level of apples. We recommend that any prediction on the price trends by the Bureau of Agricultural Economics be discontinued for the good of the industry.

6. That we express our thanks and appreciation to the various commercial and civic, state, and national agencies, with special reference to the Springfield Chamber of Commerce and radio stations KWTO and KGBX, and the Springfield newspapers, who have given their hearty co-operation in arranging and carrying out the joint program of the 53rd Convention of the American Pomological Society and the Annual Missouri State Horticultural Society Convention, and for the splendid co-operation and the fine hospitality enjoyed during the course of these meetings.

Accomplishments

The Committee on Resolutions briefly reviewed some of the accomplishments of the APS during President B. S. Pickett's regime, and because they are interesting as a record they are presented herewith:

One very important achievement has been the successful development of the National Apple Institute and the very closely correlated relationships with the various regional apple institutes. These agencies have been active in advertising. They will in the future further benefit apple growers of the United States and Canada through the rapid and larger movement of fruits to market. Again, these institutes will improve the dietary habits of the people, through the dissemination of complete and scientific information concerning the value of the apple as food.

During the last few years, the Society has held annual meetings in some of the principal fruit growing regions, where leading authorities have presented the results of their researches in such a manner as to be of definite value to the district in which the meetings were held.

Further, these addresses have been printed and made available to those interested a short time after the meetings. This practice of holding annual meetings and printing annual reports instead of biennial meetings and reports has been of great practical value to American pomology.

The monthly page, sponsored by the American Pomological Society in AMERICAN FRUIT GROWER and edited by Secretary Lantz, has been a constant and valuable reminder to horticulturists of the latest development and events in pomology.

The resumption of the tours to the leading fruit growing regions of the United States is another forward step in the development of better understandings and practices between the horticulturists of the various producing sections.

The happy relationships between the growers and the distribution agencies of the industries allied with the production of fruits has been developed during the last four years. We regard this as one of the most outstanding achievements of the present administration.

This achievement is closely linked with the question of the actual toxicity of spray residues. It is generally conceded that the leading authorities of this country are divided in their reaction to this problem. Since this is the case, the initiation in 1937 by the United States Public Health Service of research to determine the actual toxicity of spray residues will be of far-reaching importance to both producers and consumers. This program was sponsored and is encouraged by the American Pomological Society. The fruit producers of this country as a group feel that this question should be settled on the basis of scientific research. If such research should show that the health of the public is endangered through the use of certain spray materials, they will be the first to accept such findings.

These new activities have been only a portion of the projects which the Society has carried on through the years. The membership feels that the established duties of the Society, such as listing of new horticultural varieties and ruling upon matters of nomenclature, have been satisfactorily accomplished. These activities have broadened the scope, the usefulness and the vision of the Society to the degree that it is now the logical agency to which the producer, the allied industries, the technical horticulturist and the distributor look for leadership in solving the problems of the industry.

Respectfully submitted,

T. J. Talbert, Chairman
C. V. Holsinger
G. Leslie Smith, Secretary

Price Level Predictions

There is considerable resentment in fruit growing circles against the policy of the Bureau of Agricultural Economics in issuing price predictions in connection with crop reports. A resolution condemning the policy of predicting price trends by the bureau was adopted at the recent joint convention of the APS and the Missouri State Horticultural Society held at Springfield, Mo., December 8-10.

The attitude of fruit growers was pretty aptly stated by a fruit grower, who said, in substance, that when the U. S. D. A. experts predict lower prices on account of abundant supplies, a great many fruit growers try, as a result of the prediction of lowered prices, to beat the game by selling as quickly as possible, and thus depress the market unduly. And when the prediction is for higher prices, growers tend to hold their fruit too long and finally lose money. That these predictions as to price trends for fruit create an unhealthy market condition seems to be the unanimous opinion of fruit growers.

A similar resolution was adopted by the Iowa State Horticultural Society in November at Ames, Iowa, and by the Virginia State Horticultural Society meeting in December at Charlottesville, Va.

Memberships

Every mail brings in some memberships. Send in your APS dues at once because you do not want to miss the report of the convention. Dues are $1.25 per year. Remit to H. L. Lantz, secretary, Ames, Iowa.

H. L. Lantz
SECRETARY

PEST REVIEW

(Continued from page 18)

emergence begins and a second at the height of the flight or about July 15.

"Because of the habits of the flies it is necessary to spray all trees in the orchard and to remove or spray all scrub apple trees within 150 yards of commercial plantings. Experiments conducted in 12 orchards each year for four years have shown that the apple maggot may be controlled by the use of certain stomach insecticides, lead arsenate being considered the standard."

PIPE RESIDUE

Much of the pressure loss and even pipe blocking of stationary spraying systems is caused by the accumulation of spray materials in the pipes.

G. C. Taylor of the Plant Research Station, New Zealand, says: "To clean pipes, a sufficient volume of commercial hydrochloric acid diluted to one part to 19 parts of water should be prepared and held in a wooden barrel. With the pump running and the suction end and overflow placed in the barrel, the taps at the end of each lateral should be opened until discoloration in the water shows that the pipes are filled with the acid solution. When the pipes are filled, it is advisable to clean the pump with water.

"After leaving the acid solution in the pipes for about half an hour the system should be washed out with water, each tap being left open until all loosened material is removed from the pipe walls.

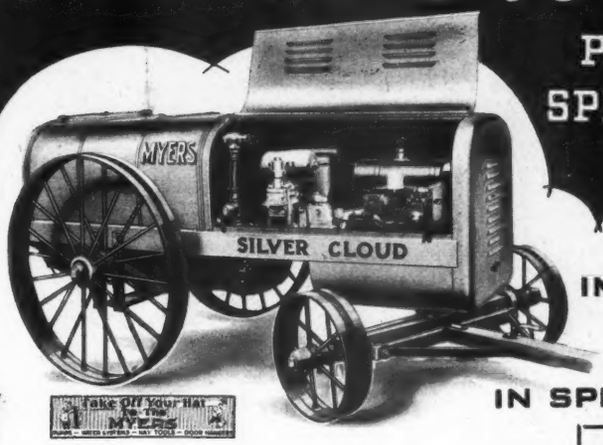
"Damage to the pipes or pump will not occur since, at the above dilution, the acid reacts slowly with iron and is rapidly neutralized by the spray deposit. We estimate that it will take approximately two gallons of acid, or nearly 40 gallons of mixture to fill the system of a 10-acre block piped with one inch and three-quarter inch mains and one-half inch laterals."

PEAR MIDGE

Destruction of the adult pear midge before egg-laying activities begin must be accomplished if this pest is to be successfully controlled. New York Agricultural Experiment Station specialists have found that the critical period for midge control is when the most advanced blossom buds in the warmest part of the orchard begin to show a trace of pink in the petals between the separating sepals.

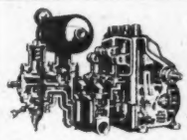
Most practical spray is nicotine sulphate used at the rate of three-fourths to one pint in 100 gallons of spray mixture. It may be used with Bordeaux, lime-sulphur, summer oil, or soap. Summer oil, used alone, also gave good results when applied at the rate of 1.7 to two gallons of oil to 100 gallons of spray.

MYERS NEW STREAMLINED *Silver Cloud* POWER SPRAYERS



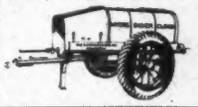
AN IMPORTANT STEP FORWARD IN SPRAY RIGS!

MYERS *Silver Cloud* Power Sprayers mark a new high in spray rig engineering practice. Their smoothly contoured outlines and gleaming aluminum finish are equally significant of an inner smoothness which means greater ease and simplicity of handling, combined with increased ruggedness and durability, more speed and higher economy of operation. Three generations of orchardists and growers have looked to MYERS as headquarters for the world's largest line of reliable spray machinery. The *Silver Cloud* Sprayers announced herewith make a truly notable addition to this line. Backed by all the reliability for which MYERS products have so long been famous, *Silver Cloud* Power Sprayers embody the most desirable improvements which modern engineering practice has revealed. Your MYERS dealer will gladly supply full particulars.



The pump is the very heart of power spray efficiency No other power spray pump has such perfect lubrication and proven service life as the famous MYERS *Self-Oiling* Pump used in these *Silver Cloud* Sprayers. All working parts run continuously in oil. Fully enclosed yet remarkably accessible. VALVES stainless steel. CYLINDERS porcelain lined. Improved double cup expansion PLUNGERS with adjustable take-up.

MYERS *Silver Cloud* Sprayers are offered in both engine powered and tractor operated models. Come completely equipped with hose, guns and fittings. Duplex, Triplex and Quadruplex pump capacities. Wheels either steel or rubber tired. Frames all steel, arc welded.



The MYERS Spray Catalog is a veritable text-book of spraying information. It shows the complete MYERS line for work in orchards, groves, vineyards, row crops, fields and gardens. Engine powered sprayers, traction driven sprayers, and tractor operated sprayers; hand operated bucket and barrel sprayers, knapsack and compressed air sprayers; tobacco sprayers; berry and greenhouse sprayers, garden sprayers. Mail the handy coupon today for your interesting FREE COPY.

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MYERS Self-Oiling POWER SPRAYERS

University of Idaho

STATE NEWS

MARYLAND—A couple of years ago it became evident that more spraying equipment would be necessary on the 200-acre Mount Pleasant Orchards in Harford County. It was a case of more equipment, houses, and men, so C. E. Bryan, the owner, figured that better water supply and more filling stations would solve the problem by mere saving of time.

A four-inch water line was laid, reducing to a three-inch line for the lower parts of the orchard. Filling stations were so located that it is never necessary to drive more than two tree rows to fill up.

It takes about one minute to fill a 300-gallon sprayer and mix the spray materials. Using two guns at 450 pounds pressure, the sprayer is emptied in 18 minutes. Each sprayer is equipped with a tower on the tank for reaching the tree tops.—A. F. VIERHELLER, Sec'y, College Park.

FLORIDA—Continuance of the upward trend in production of Florida citrus in 1938 is predicted by the State Extension Service.

The Florida orange crop is expected to increase at a faster rate than that of California or Texas. Average production of oranges in the United States during the past five years has been 54,000,000 boxes. Probable

average for next five years: 55,000,000 to 60,000,000.

With only 31 per cent of all trees in the four main producing states now in production, grapefruit production is expected to rise steadily during the next five years. Florida produced 18,000,000 boxes in 1936-37 with only 61 per cent of its trees in production.

Exports of grapefruit from the United States in the next five years probably will not exceed those of the past five-year period because of rapidly increasing world grapefruit production. Exports of canned grapefruit, however, have been increasing and indications are they will continue to rise. Canning of Florida grapefruit has become an important factor to the industry.

RHODE ISLAND—An all day meeting of Rhode Island Fruit Growers Association is planned for March 19, at Infantry Hall, Providence. Speakers invited to attend: Dr. Ralph Van Meter and Dr. J. K. Shaw of Massachusetts State College, and Prof. Howard Rollins of Connecticut State College. An Apple Pie Baking Contest, the finals to be held at the time of the meeting, is planned.

Mouse injury checkup in one Chepachet orchard showed that the new bait distributed by the U. S. Biological Survey was effective, dead mice having been found under wood piles.—E. P. CHRISTOPHER, Sec'y, Kingston.

ILLINOIS—One of the largest fruit producing areas in the State is centered around Centralia. Interest and attendance during the three-day Illinois State Horticultural Society convention, which had Centralia as its setting, therefore were unusually satisfactory.

C. F. Heaton of New Burnside, one of the State's most prominent fruit growers, was elected president to succeed G. Leslie Smith of Rock Island.

The Illinois State Horticultural Society—one of the oldest agricultural organizations in the State—for the past 82 years has served the fruit industry in a most efficient manner. —JOE B. HALE, Sec'y, Koll.

NORTH CAROLINA—Carl E. Van Deman, former Vermont extension horticulturist and assistant secretary of Vermont Horticultural Society, has been placed in charge, by North Carolina State College and the State Extension Service, of the new State research sta-

tion and laboratory recently erected at Kilby's Gap.

The station was erected and will be maintained by the State out of a $10,000 appropriation for the biennium. Land on which the laboratory was constructed was donated by Caney Lowe, of Pores Knob, and Brushy Mountain fruit growers have raised funds for furnishing the building in order that more of the appropriation by the State will be available for actual research work.

NEW YORK—Probably for the first time in state horticultural society history, Mrs. Fruit Grower held an important place in the speakers' program. During the recent New York State Horticultural Society meet at Rochester, Mrs. J. Carl Ward pinch-hitted for her husband who was scheduled on the program but was confined at home with a cold. The Wards have an interesting peach development at Olcott.

Well attended business sessions featured the entire meeting, which concentrated on marketing. One diversification in program setup took place when a group comprised of a grower, country point buyer, commission man, and a State marketing specialist, conducted from the stage a round table discussion on marketing problems. Frequent questions from the grower audience added to the value of the discussion.

George A. Morse of Williamson will serve as 1938 president of the society.

WISCONSIN—Active participation of the ladies in an apple cooking school held during the annual Fruit Growers Convention of Wisconsin Horticultural Society at Waukesha

prompts us to recommend that all horticultural societies give the ladies a part in their convention.

The school was conducted by home demonstration agents of Milwaukee and Waukesha counties for fruit growers' wives and other ladies in the community. It will be continued at future meets.

In the new varieties shown, Cortland created greatest interest. Local-grown Kendalls were not available, and a sample shipped in proved to be somewhat large in size and immature, though Kendall shows considerable promise, and many trees have been planted in the State.

Beacon, the new Minnesota variety, is gaining in favor as a competitor of Duchess because of its solid red color and longer keeping qualities, while Orleans is the most popular of the Delicious crosses by New York Experiment Station. McIntosh continues to be the most popular apple in Wisconsin.

Since the motion picture film entitled, "How Wisconsin Fruit Growers Spray Their Orchards," produced by the society during the past season, is very popular with growers, it will be shown at local fruit growers' meets throughout the State this winter.—H. J. RAHMLOW, Sec'y, Madison.

MASSACHUSETTS—With an estimated three-day attendance of better than 1500, Massachusetts Fruit Growers Association's annual convention went down in history at the most successful meeting in the association's 43 years of existence. Meetings were held in Worcester as part of the Union Agricultural Meeting, sponsored by the State Department of Agriculture.

Officers elected for 1938: President, John E. Rice, Marboro; vice-presidents: Arthur M. Howard, Pittsfield; Ralph A. Van Meter, Amherst; D. Walker Cheney, Brimfield; Hamilton Lincoln, North Brookfield; and W. A. Greene, Oxford; secretary-treasurer, W. R. Cole, Amherst; vice-president of New England Fruit Show, Fred C. Sears, Amherst.

A feature of the meeting was a tour by proxy through 35 states of the Union visiting the principal fruit growing sections. The

tour was conducted by Prof. Howard A. Rollins of Connecticut State College who this past summer traveled 17,400 miles in a trailer with his family. All of the movies were in color.—WM. R. COLE, Sec'y, Amherst.

INDIANA—New officers elected at the well attended 77th annual Indiana Horticultural Society meet held in Lafayette in early January were: L. V. Doud, president, and Meredith Reed, vice-president.

Reports from 70 of the State's 92 counties show that Hoosier farm folks canned 500,554 quarts of fruits, of which one-third was purchased from local or nearby fruit growers, according to W. B. Ward of Purdue.—R. L. WINKLEPLECK, Sec'y, Lafayette.

OHIO—Since a complete change to new materials may be a costly experiment, H. C. Young, chief of the Botany Department, Ohio Experiment Station, offers the following suggestion to fruit growers who are selecting fungicides:

If diseases are being controlled, the finish of the fruit is satisfactory, and the grower is having no loss from spray injury, he should continue the same spray schedule that has been used. If things are not going satisfactorily, the grower should vary the spray schedule slowly until a suitable one is evolved.

MINNESOTA—At the 71st Minnesota State Horticultural Society meet it was decided to drop the following from the recommended fruit list of the society: Folwell apple, Mendota plum, Lucile grape, Nokomis and Minnehaha strawberries, and all varieties of blackberries.

New varieties added to the recommended list: Cortland apple, Pixwell gooseberry, Caco grape, Fiebing plum, and Gem strawberry. Dorsett and Fairfax strawberries were dropped

from the trial list and Catskill strawberry was added. Dr. W. G. Brierley is chairman.

Special emphasis in the production of cross bred seed is being placed on cherries, plums, strawberries, and raspberries, according to the report of University of Minnesota Fruit Breeding Farm by Prof. W. H. Alderman and Fred E. Haralson.

Prof. Alderman was awarded State Horticultural Society Bronze Medal, in recognition of the successful work of Minnesota Fruit Breeding Farm which he directs. Recognition was given Harold Nipp of Winona County as the State Champion in the 4-H Club fruit growing project.

Fruit judging contest, sponsored by the Fruit Growers Association, was won by D. C. Webster of La Crescent, with second place to Arnold Ulrich of Rochester, and third place to Vincent K. Bailey of Newport.

Plans to distribute daily market information during the berry season were made at a special meeting of the association.

New State Horticultural Society officers: T. E. Carpenter, St. Paul, president, and L. R. Fischer, Minneapolis, vice-president. R. S. Mackintosh was re-elected secretary.

Minnesota Fruit Growers Association 1938 officers: Henry W. Leidel, La Crescent, president; Leon F. Gates, Rochester, vice-president; J. D. Winter, St. Paul, secretary; Fred Blomberg, Deerwood; Fred W. Braden, Wayzata; F. M. Schwab; Mankato, and S. M. Thimsen, Hopkins, directors.—J. D. WINTER, Sec'y, St. Paul.

Staff members of **AMERICAN FRUIT GROWER** have visited many fruit farm cold storages. Some of their observations may be helpful to you. There is now available, through **AMERICAN FRUIT GROWER** Reader Service Bureau, information on cold storage construction. Address your inquiry to Reader Service Bureau, **AMERICAN FRUIT GROWER**, 1370 Ontario St., Cleveland, Ohio. Please state type of construction in which you are interested, size of storage you are planning, length of time fruit is to be held in storage, and the average temperatures in your locality at harvest time.

MIDDLE ATLANTIC STATES FRUIT GROWERS ORGANIZE

The Middle Atlantic Fruit Growers' Conference, composed of growers of Pennsylvania, Maryland, West Virginia, Delaware, Virginia, and New Jersey, held its first meeting in Washington, D.C., January 4-5.

This organization was sponsored by Maryland State Horticultural Society and organized under the leadership of President C. E. Bryan. Purpose of the conference is not to supplant the horticultural societies of these states but to work with them and afford growers of the region a greater opportunity to get together and discuss and act upon problems affecting the region as a whole.

Some of the main points brought out by the able speakers on the program: We are in the midst of an era of research of new materials and methods, which must be applied in accordance with varied conditions encountered. Cost of production per tree and per bushel are of prime consideration in relation to profits realized.

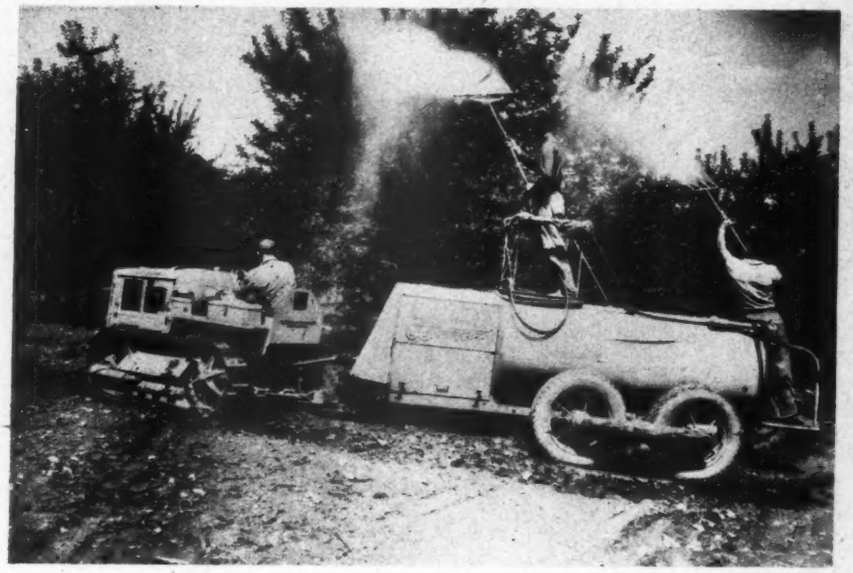
Apple advertising must be directed at the housewife, as she does 85 per cent of the buying. A standard box is needed, and the one and one-fifth bushel looks good.

Officers for the coming year: C. E. Bryan, Havre de Grace, Md., president; A. F. Vierheller, College Park, Md., secretary-treasurer pro tem; and an executive committee of H. W. Skinner, Chambersburg, Pa.; F. H. Wissler, Mt. Jackson, Va.; Ed. A. Leatherman, Rada, W. Va.; G. S. L. Carpenter, Hagerstown, Md.; C. W. Smith, Bridgeville, Del.; Byron C. Roberts, Marlton, N. J.

"WE BOUGHT 4 TWENTY-TWOS ON 15 YEARS OF PROOF,"

—WRITES HAROLD M. ROGERS,

ROGERS' ORCHARDS, SOUTHINGTON, CONNECTICUT!



"The serviceability and efficiency of 'Caterpillar' track-type Tractors have been amply demonstrated on our rough, hilly orchards for the past fifteen years," writes Harold M. Rogers, Manager of Rogers' Orchards, Southington, Connecticut.

"Two of 3 'Caterpillar' Twenty-Two Tractors, which we purchased in 1936, replaced 2 former models that had been in heavy service for ten years. We now use about the same number of gallons of tractor fuel as we formerly used of gasoline to accomplish the same work, at one-half the cost. To pull a heavy-duty, 7-foot double-disk harrow, for example, a Twenty-Two uses only $1.05 worth of fuel daily."

As further proof of Rogers' Orchards satisfaction, they bought the fourth Twenty-Two in 1937. Here is one of their tractors, operating a 600-gallon power take-off sprayer—pulling loads of spray over the grades and driving the 30-gallon per minute pump *on only 2 gallons* of fuel per hour!

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Gentlemen: Can I use a "Caterpillar" track-type Tractor profitably in my orchard?

Size of orchard_____ Power now used_____

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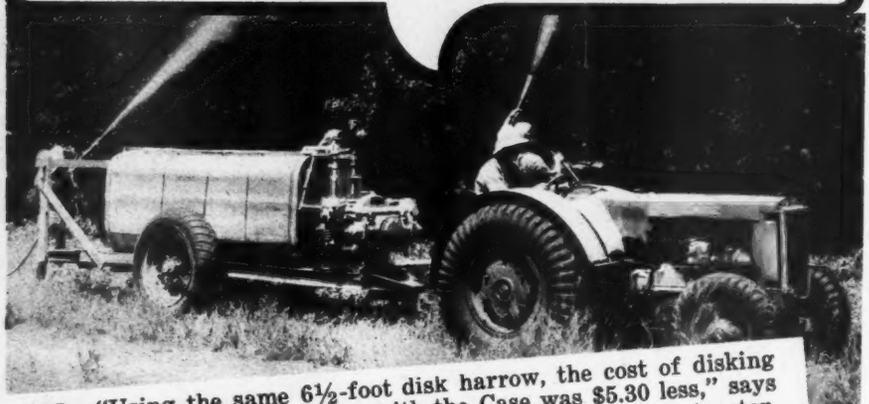

"Using the same 6½-foot disk harrow, the cost of disking one certain 20-acre plot with the Case was $5.30 less," says Geo. Meiser in comparing his Case with his previous tractor. "There also was a saving of five hours time." Mr. Meiser takes care of 300 orchard acres with his Case "CV," and in 3600 working hours . . . equal to 144,000 miles with a motor car . . . his fuel consumption has averaged only 1¾ gallons an hour.

That's why more and more fruit men are changing to Case . . . they get more work done, and get it done at less total cost. They like Case speed at full load . . . easy steering and ability to take short turns with heavy load . . . superb balance and compact construction that permits working close to trees without damage to fruit or foliage . . . time saved in greasing and fueling . . . fuel freedom that cuts costs because Case tractors burn any standardized tractor fuel from No. 1 furnace oil to gasoline.

Case orchard implements match the speed and power of Case tractors with stamina to stand up at sustained speed . . . better bearings and lubrication for longer life . . . easier operation, simpler adjustments, more perfect work. There is an orchard model of the Case Centennial Plow; cover crop disk harrows in tandem and offset styles; spring and spike-tooth harrows; subsoil tillers, drills, mowers, etc. See them at your Case dealer; mail the coupon today.

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For special fruit-grower catalog, also "It's Total Power Cost That Counts," fill blanks below, mark machines that interest you, and mail to J. I. Case Co., Dept. B-12, Racine, Wis.

- ☐ Orchard Tractors
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Powerful 1 and 2 Cylinder Tractors for Small Farms, Gardeners, Florists, Nurseries, Fruit and Poultry Men.

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With Ample Power for Field, Haying and Truck Crop Tools. Run Pumps, Saws & Belt Machines.

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NEW NICOTINE SPRAY

(Continued from page 15)

backlog of insoluble and non-volatile nicotine in the tank, then oils, or sulphurs if desired, can be added. Nicotine, as such, is still the insecticide, but in barrier form.

Nor do these new materials have their only place in heavy codling moth areas. Since they take the same amount of nicotine as formerly used, and do more with it—use it more economically—then it must cost less, or do more. It does do more, for, when nicotine in this new form bears the brunt of the codling moth attack alone, neutral sulphurs can be added to the tank to control scab. When sulphurs are no longer necessary, summer oil, a friend of long standing, can be added and the nicotine reduced as much as one-half. In either case successful control has been demonstrated. Therefore, service, or economy, or both, are inherent in these new nicotine sprays when we *understand* them and *use* them.

To *understand* a nicotine codling moth program, remember that—

Insoluble and non-volatile nicotine has been shown to have the required toxicity to the hatching and entering worms when applied and when the proper time has come to repeat the application.

Out of the past of nicotine, the manufacturers of "Black Leaf 155" have retained as much of the contact effect as possible, enough to get some eggs, young larvae, and some of the adult moths, as well as hatching leafhoppers, leaf-miners, and aphids.

Summer oil and other deposit-building aids are still the effective allies of nicotine.

It stands alone, at the convenience of the growers who want to use sulphur, or who want a wholly non-caustic protection for their trees and fruit.

To *use* a nicotine codling moth program, remember that a chain is

(Continued on page 32)

This Modern, homelike Hotel, on FLORIDA'S most healthful SOUTHEAST COAST, affords a refined atmosphere for rest. ONLY 25 minutes' drive to MIAMI and its varied diversions. MODEST RATES: GOLF, FISHING, SHUFFLEBOARD, OCEAN BATHING, TENNIS, CLOCK GOLF, Etc. Official AAA Hotel.—Ownership-Management.

DANIA BEACH HOTEL

DANIA FLA

CODLING MOTH AND STONE FRUITS

(Continued from page 12)

generation larvae did not transform to moths until the following year. That is to say, there was evidence that a one-generation strain of the insect was developing in apricot orchards.

In August, 1926, the author was called upon to investigate an infestation of codling moth in a 20-acre orchard of Kelsey plums near Pomona, Calif. Plums infested by the insect were readily observed on all the trees. Many wormy plums had fallen to the ground. There were no apple or pear trees in the immediate vicinity and the evidence indicated that the insect had been maintaining itself exclusively on the plums. Rather heavy losses from wormy plums had been experienced in preceding years, but the damage had been casually attributed to the peach and plum twig borer. The second generation larvae of this insect attack the fruit. It has been suspected that some of the early reports of codling moth on stone fruits were the result of mistaking the work of the twig borer for that of the codling moth.

The infestation of codling moth has persisted in this orchard, and a similar condition has come to exist in other orchards of Kelsey plums in the same district, including 70 acres owned by the Stensgaard Brothers, who also owned the 20-acre orchard where the original infestation was found and who first demonstrated the effectiveness of spraying in controlling the pest. The heaviest infestation was in 1931, when the loss ranged from 10 to 20 per cent of the crop in different orchards.

Since the Kelsey plum is harvested usually between the first and the fifteenth of August, the author at first supposed that only one generation of the insect would be able to develop in plum orchards. However, studies have shown that two generations may follow from the earliest eggs laid. In 1932 larvae were found entering small green plums on April 28. These larvae attained full development and pupated, and the first moth emerged June 1. Second generation larvae entered the green plums during June, attained their full development and emerged before the plums were harvested the first week in August.

The first week in May, 1933, eight small green plums approximately one-half inch in diameter, containing young codling moth larvae, were brought into the laboratory and kept in a glass jar. It was surprising to find that all the larvae attained full development. The forming seeds were entirely consumed and there remained

(Continued on page 29)

FARMERS WANTED IT
FORD BUILT IT

New One-Tonner BRINGS FORD V·8 ECONOMY TO ONE-TON RANGE

Farmers have felt the need for greater economy in the one-ton-load range. Many have asked Ford to build a unit that would handle one-ton loads with the same proved performance and economy that Ford V-8 units of larger and smaller capacities bring to their respective fields. Result: The new Ford V-8 One-Tonner.

The One-Tonner has a 122-inch wheelbase. It has been designed to take advantage of the unusually economical 60-hp. V-8 engine, although the 85-hp. V-8 is also available where higher speed and faster acceleration are desired.

Though low in price, the One-Tonner has the time-proved features that make the larger Ford V-8 Trucks so reliable. Frame, springs and axles are designed for high reserve strength, without penalizing economy with excess weight.

There is a body type for practically every need in the one-ton range: Stake, Panel, Express—also Cab and Chassis or Drive-away Chassis. Visit your Ford dealer and arrange for an "on-the-job" test with your own loads and your own driver. Also see the new 1938 Ford V-8 134-inch and 157-inch wheelbase Trucks and the new 112-inch Commercial Cars.

NEW FEATURES OF 1938 FORD V-8 TRUCKS
New styling • More comfortable cabs—3 inches more head room—handsome new interior trim • New, quicker stopping brakes • New 134-inch wheelbase, with 60-inch cab-to-axle measurement • For 134-inch and 157-inch trucks, new standard frame width • New, larger spindles • Easier steering • 7.50-20 dual tire and wheel equipment at extra cost.

1938 FORD V·8 TRUCKS

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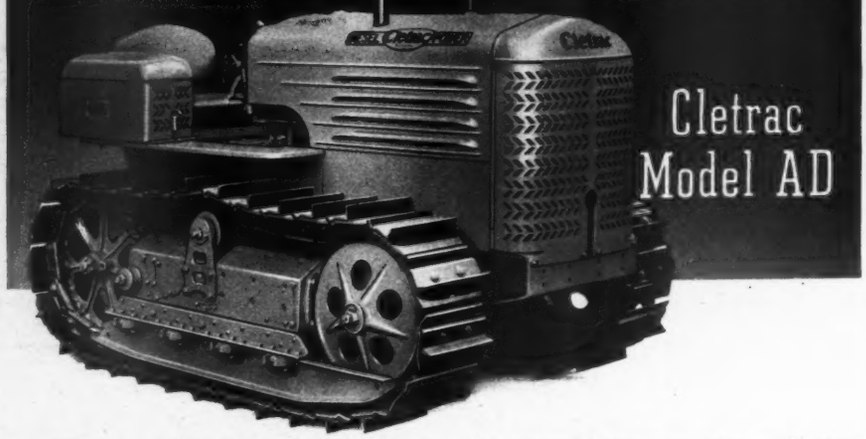

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Here is your *first* opportunity to enjoy the economy of Diesel power in a four-cylinder tractor of 28 horsepower.

But more than economy, the Cletrac Crawler gives you the dependable power you need in orchard work. You have power and traction that can get in and pull the spray rig regardless of weather and ground conditions ... uphill, through mud and soft going. You do the job when it should be done when you own a Cletrac.

Model AD Cletrac develops better than 70 per cent of its weight in drawbar pull... it does more work in less time ... keeps your work on schedule... eliminates overtime and extra crews ... saves labor... and can be used on heavy farm jobs as well as in orchard operations.

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CODLING MOTH AND APPLE PRODUCTION

(Continued from page 13)

a reasonable question. The answer is more improved production methods employed by the apple grower.

Many of us, growers and scientists alike, have labored under the impression that we were making little or no progress in combatting the problems facing the apple industry. Based upon the performance of our apple orchards today, it is evident that this idea is altogether erroneous. Better spraying is materially reducing codling moth and disease losses. Clean apples are filling containers, whereas, in earlier days, vast quantities fell to the ground as waste.

Naturally, more efficient spraying alone cannot be given all of the credit. Improved horticultural practices in the form of more effective fertilizer usage, tillage, and pruning methods have a direct bearing on the changes that have taken place in the apple industry. These practices have increased volume in the orchard, but this volume would be of little value if spraying practices permitted the development of a high percentage of wormy or diseased fruits.

Regardless of the fact that growers have materially raised their standard of control and the production of a much greater percentage of marketable fruit, it appears to the writer that knowledge now available could be used to advantage in the further reduction of codling moth losses and other troubles.

Referring again to the chart, it will be observed that the 80,000,000 bearing apple trees in the country are producing, in round numbers, 140,000,000 bushels of fruit or less than two bushels per tree. This production is a vast improvement over conditions prevailing in 1910, yet a yield of this extent indicates that the

(Continued on page 30)

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99% pure, always uniform—the standard for home mixed

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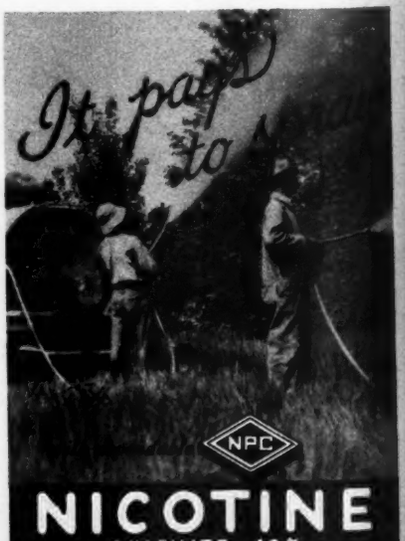

NICOTINE PRODUCTION CORPORATION
CLARKSVILLE, TENNESSEE

CODLING MOTH AND STONE FRUITS

(Continued from page 27)

but a shell of the fleshy tissue of the fruit. Six of the larvae pupated, and the moths emerged between May 29 and June 6. The remaining two larvae eventually died, but probably would have survived and transformed to moths the following year had they been in their normal environment.

This very limited study shows that the pest on plum is not a strictly one-generation strain. It is possible, however, that a majority of the larvae hatching later in the spring do not transform to moths until the following year.

Spraying with lead arsenate was begun in 1932. The treatment proved to be highly effective and it was at once adopted as a practice in the growing of plums in the district mentioned. The spray consists of three pounds of basic lead arsenate and one pound of casein spreader to 100 gallons of water. One application is sufficient to give effective control. The spraying is done usually the first half of May when the plums are about one-half inch in diameter. Enough spreader is used to give an even film coverage.

Observations have shown that most apricot plantings in the Riverside district are infested every year by the codling moth. The loss from worms, however, usually is not more than one or two per cent. Control measures have not been practiced.

The lower per cent of infestation on apricots than on plums is apparently due to the fact that but one generation of the insect matures on apricots. The crop is usually harvested the first half of July. The larvae do not appear to thrive as well on small green apricots as they do on small green plums. Life history studies indicate that many of the earlier worms perish in the green apricots and the later worms reach their full development as the fruit ripens. Some of the worms pupate and give rise to second generation moths which deposit eggs on the fruit.

During the period of 10 years that the codling moth on stone fruits has been under observation, there has been no appreciable increase in the severity of the infestations. This fact may be regarded as indicating that stone fruits are not particularly suitable hosts and that there is no likelihood of the insect becoming a serious pest of such fruits. The author is disposed to take this view of the matter. On the other hand, it will be recalled that 30 or 40 years ago the codling moth was a far less serious pest of apples than it is today. Even as late as 1910, effective control was obtained in many districts

(Continued on page 32)

IT HAS *Everything* IT DOES *Everything* IT'S A *Beauty*

FULLY STREAMLINED and guarded, the "70" slips in low under the trees to do any orchard job and does it well—and it's easy to duck low branches. The tip of the steering wheel is just above the hood line, the exhaust is carried down inside the hood, the operator drives from a low upholstered seat, or the special drawbar platform—all controls are easy to reach.

Before you buy any tractor, drive an Oliver "70."

Hook onto a New Oliver Orchard Cultivator with *Double Power Lift*

Here's another, better tool for working your orchard—the new 65 series cultivator for multiple subsoiling, breaking up so-called hardpan or plow sole, cultivation and irrigation work. It has many new features that you'll like, but most important it has the tough strength to stand the twisting, torturing strains of hard work.

And its *double power lift*, operated on both wheels at the same time, pops the teeth out of the worst soil, evenly, smoothly, without twisting or wrenching the frame.

IT HAS EVERYTHING

Tree Protection—safety for trunks and low-hanging branches—completely streamlined and shielded, with compact over-all dimensions—no sharp projections—downtake exhaust.

Driver Comfort—easy-riding low upholstered driver's seat—low auxiliary platform on drawbar support—automotive steering speeded by foot-operated steering brakes.

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Variable Speed Governor so that you use only the power you need for any job.

Modern Engines—for high and low grade fuels—the "70" HC (high compression) for today's high octane "regular" gasoline—the "70" KD for kerosene or distillate.

4 Speeds Forward—2½, 3⅓, 4⅓, and 5¾ miles per hour.

AND—you can get the "70" *with or without* self-starter, power take-off, belt pulley, rubber tires, electric lights.

The "70" Enables One Man to Do More Work More Easily Than Before

IT DOES EVERYTHING

Plows—with 2 big bases or 4 discs at two plowing speeds, 3⅓ and 4⅓ m.p.h.

Pulls—a deep working orchard cultivator, orchard harrow or other tillage tools.

Pulls and Drives—large power sprayers or other power equipment when equipped with power take-off.

Does Irrigation Work—and has the extra power needed for breaking new land.

Mows—with tractor-drawn mower.

In the Belt—the belt pulley attachment is easily installed or removed between jobs; it is extra equipment. Ample, steady power.

Hauling—ideal for pulling a trailer truck to transport men and supplies and to haul out the crop.

High Road Speed—in addition to the high speed of 5.88 m.p.h., higher top speeds are available on order.

And—there's a host of other jobs, heavy and light, for which the "70", with its variable speed governor, provides efficient power.

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Before you buy any tractor—ask your Oliver Dealer to demonstrate the Orchard "70".

See your Oliver Dealer or send the coupon below for the "70" Catalog that tells everything about this new beauty that has everything, does everything. Before you buy any tractor, drive an Oliver Orchard "70".

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Please send me the Oliver "70" Catalog as checked below:
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No Humus or Erosion Problem In This Orchard

LAST year at the Ohio Experiment Station a yield of 1575 pounds of air-dried hay was secured where no fertilizer had been applied between the trees, *but* where 200 pounds of 'Aero' Cyanamid per acre had been broadcast, the yield was 4000 pounds.

400 pounds of Cyanamid per acre brought the yield of dried hay up to 5000 pounds.

Broadcast Granular 'Aero' Cyanamid In Your Orchard

Then Watch The Cover Crop Grow!!

Write for Leaflet F-142

AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA NEW YORK, N. Y.

CODLING MOTH AND APPLE PRODUCTION

(Continued from page 28)

industry, as a whole, is on a decidedly non-profit basis. Any good grower knows that he cannot meet expenses with a two-bushel average. It would appear there is need for the further elimination of the marginal tree.

It is a well established fact that benefits resulting from an effective insect and disease control program are cumulative. The chance of recurrence, year after year, of apple scab, pear scab, and many other diseases, is greatly reduced by holding the infective properties of these diseases at a low level.

The same principle operates in the case of the codling moth. Our work at the Hood River station demonstrates the point. In a well sprayed 10-acre block moth catches for the past nine years have indicated relatively low uniform populations year after year. Commercial control in this block has been consistently good, season after season, ranging in a percentage loss of actually wormy fruit of .76 per cent to 2.2 per cent for the period. Where populations are high, the problem appears to be that of driving the population down to a low level and holding it there.

What can be done to assist in bringing about this condition? In most apple sections of the country, highly effective spray schedules—if properly used and timely applied—are available to growers. From this usage the good operator produces relatively clean fruit, but the cost is high and the battle continuous. If each and every tree in a district could be sprayed in such a manner, the moth population would eventually be driven down to a low level and could be held there with a material reduction in present day worm losses and spraying costs.

Looking at the apple industry as it appears today, a situation of this sort

(Continued on page 35)

KILL CODLING MOTH
WITH
COD-O-CIDE

TREE BANDS . . . The original Tried and Proven band. Ten years successful use to their credit. . . . State number of 250-foot rolls 2 inches wide you will need, as price varies with quantity. Also state Pruning, Spraying, Dusting requirements for lowest cash factory prices.

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A Practical, Power Plow and Cultivator for Gardeners, Suburbanites, Florists, Truckers, Nurserymen, Fruit Growers
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A new grafting compound endorsed by Michigan State College. Moderately priced and applied cold with a brush. Used also as a protective coating for injury. We can also supply Hand and Brush grafting wax and wax heaters. Send for price list. Dealers wanted. If interested send for free booklet "Bees & Fruit" by E. R. Root.
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to keep plants or trees free of fungus use COPPER
Copper Sulphate
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IN FLORIDA, U.S. PHOSPHORIC PRODUCTS CORP., TAMPA

SPRAY GUN MAN

(Continued from page 9)

applications directed from the outside to cover the upper surfaces of expanding leaves and blossoms are most needed in early season scab sprays.

With satisfactory working pressure fog drive guns or brooms in good working condition have caused no mechanical injury when spraying so that the orifice of the nozzles almost touches fruit and foliage. Single nozzle guns on the wide fog adjustment were usually found safe if fruit and foliage were within three to five feet of the nozzle, but when wide open to get distance or height were seldom safe if fruit and foliage were closer than 10 to 15 feet from the nozzle.

Actual spray application methods must be worked out to fit the needs of each orchard. The results will soon tell the grower whether the method he uses can be improved. Spraying from the tower of a portable rig, where practicable, is most convenient for the sprayman. It permits use of broom and gun combinations that take the capacity of the larger pumps, giving the sprayman more gallons per minute to handle than any other method.

Combinations of tank and ground spraying are often effective. Excellent coverage of mature trees is being secured with ground spraying when guns of sufficient capacity are used for top spraying. This method is still widely used with many portable sprayers and with the stationary systems.

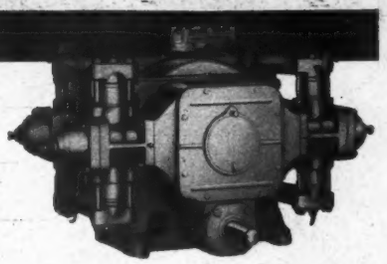
Many difficulties are encountered when growers insist on only "spraying with the wind," because often the orchard is not completely sprayed within the necessary time interval for best control of pests. Applications must be completed on time and methods employed that secure prompt, complete coverage. Commercial apple orchards should use equipment and methods that provide for a complete application in three days or less, especially for apple scab sprays. Occasionally a critical scab spray must be applied in about a day's time for best control.

To determine the size of spray pump for a given job, figure gallonage requirements for one application, and secure a pump with sufficient gallons per minute capacity to apply the spray solution in three working days or less. Keep in mind time needed to refill sprayer, and allow for emergencies. Convenient water supplies, orchard filling stations, or hauling water to sprayer permit efficient use of portable spray pumps. Stationary spray pump installations permit almost continuous use of spray pump capacity.

Select a tank for portable rigs as large as can be pulled to advantage,

(Continued on page 33)

MOST PUMP

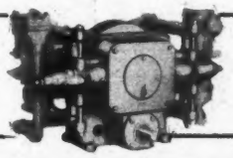


***in* LEAST SPACE**

Pressures: **Over 1,000 lb.**
Capacity: **50 to 60 gal. per min.**

IDEAL for LARGE ORCHARDS—the wonderful compactness of the new "Friend" YX makes it a splendid pump for spraying with a motor truck.
Occupies only 12½ cu. ft. of space—but big capacity and high pressure.

NO PORCELAIN LINING in the pump cylinders, as the plungers do not touch. A real "Friend" pump, with Scotch yoke drive—only ⅓ as many moving parts. Which means *lowest upkeep cost*, and *unequalled reliability*.

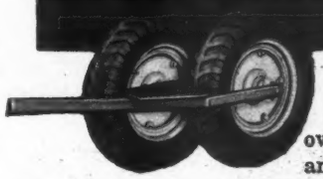


The New UX "FRIEND," a 4-cylinder pump of 16 gal. per minute capacity, at 600 lb. pressure. Fully enclosed; Timken bearings. Compact—with the "Friend" *Simplicity* and *Reliability*.

In ALL Chassis Styles

"Streamlined" sprayers to protect low-hanging fruit . . . Skid mounted for use on trucks . . . also Tractor-Trailers, Combinations, etc. Power outfits in capacities from 5 to 70 gallons per minute. Also Traction machines and hand sprayers.

And the New "Friend" **Patented TWIN WHEEL**



***design* MOUNTING**

It keeps your sprayer *on the level* when moving over soft or rough ground—rides right over holes and ditches.

The twin wheels have close centers that give easy turning. Smooth level travel saves the sprayer's tires, axles, bearings—the entire machine. Has been a big success with growers who must move sprayers over irrigation ditches.

Also standard Two-Wheel machines

A GOOD Duster at a Low Price. The "Friend" Junior costs less because its fan is mounted directly on the motor shaft—fewest parts, but well built and reliable. Covers 30 acres a day. Heavy Duty dusters for large acreage.

Before you buy a Sprayer or Duster, see the "Friend" that fits your needs. And talk to growers who have "tried them all"—who will tell you that the "Friend" Sprayer is the Most Reliable on the market.

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SPRAYERS *and* DUSTERS

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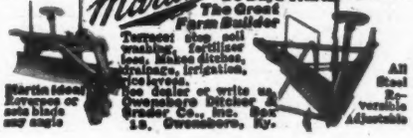

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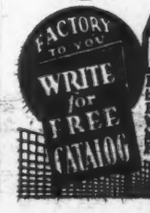

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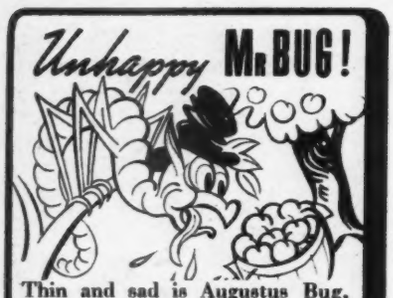

Thin and sad is Augustus Bug, but too wise to eat where *Alorco* Cryolite protects; he fears fatal indigestion! Seriously, *Alorco* Cryolite controls codling moth, flea weevil, curculios, other chewing insects. Properly used under normal conditions it doesn't injure fruit or foliage. Fine particles, dusted or sprayed, cover more surface, stick better. Obtain from your dealer, or write distributors for literature.
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Build Your Own—We Show You How!
Easily made from old auto generator. Dime brings complete plans and 1938 catalogue. 50 other generator changes to 6, 12, 32, 110 volt plants, motors, welders, elec. fence, etc.
LaJay Mfg., 463 LaJay Bldg., Minneapolis, Minn.

CODLING MOTH AND STONE FRUITS

(Continued from page 29)

by the application of a calyx spray and one cover spray, while at present several sprays fail to give satisfactory control.

A similar increase in the severity of attack has been observed in the case of English or Persian walnuts in southern California. For many years the infestation of codling moth on walnuts was so light that control measures were unnecessary. In certain districts at present the loss from worms amounts to 20 or 30 per cent in some years, despite the usual control measures of spraying and banding.

The possibility exists that the factors which have operated to bring about the greatly increased severity of attack in the case of apples and walnuts may through the passing of years bring about a similar situation in the case of stone fruits.

NEW NICOTINE SPRAY

(Continued from page 26)

only as strong as the weakest link. Successful timing of every application can bring excellent results at low cost, but failure with nicotine produces the same results as with any other material. Reasonable care in timing the applications to match the growth of the fruit, thoroughness of application of well-mixed materials, and maintenance of protection can mean success. The new nicotine sprays have plenty of latitude for the capable grower, and they have already developed a reputation for effectiveness.

WHY SPRAY YOUR EYES?

Why nag them into rebellion with the biting fluids used in spray mixtures? Eye protection costs little and can be made absolute. Use Cesco Sprayers' Goggles. They are made with extra soft molded rubber eye cups, for COMFORT; and wide angled lenses that permit clear vision in all directions, for EFFICIENCY. This safeguard—made by the oldest and largest exclusive manufacturer of Eye Protective Equipment in U. S.—is *right to the smallest detail.* Order today; see special offer below.

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To offset the effects of inhaling into your mouth, nose, throat and lungs, the irritating chemicals used in fungicides, shading compound, insecticides, whitewash, etc., equip yourself with a No. 80 Cesco Respirator. This device also is amazingly comfortable, completely effective and inexpensive.

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Sprayers' Goggles, per pair, $1.00 Postpaid.
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If ordered together $2.75 Postpaid.
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SPRAY GUN MAN

(Continued from page 31)

to save time in refilling. With power take-off rigs be sure sufficient reserve power is available in the tractor above that necessary to pull the filled sprayer over most difficult areas and at the same time provide sufficient horse power according to manufacturer's specifications. The following table is roughly suggestive of pump sizes needed for various sized orchard requirements. In addition, use spray pump manufacturer's suggestions on sprayer requirements.

Spray Materials Required for One Application	*Pump Size Required in Gallons Per Minute on Portable Rigs*
Less than 500 gals.	Hand Pumps
500 to 3000 gals.	Power pumps rated up to 10 gals.
3000 to 6000 gals.	Power Pumps rated at 12-15 gals.
6000 to 10,000 gals.	Power Pumps rated at 15-22 gals.
Above 10,000 gals.	Power pumps rated at 35 gals. or more according to need

Check pumps occasionally to determine gallons per minute actually delivered through hose and nozzles. Spraying into a large open-head drum of 50-gallon capacity or larger for a given period, such as one minute, and measuring discharge with gauge stick previously notched in gallons is helpful for check-up work. Many rigs, especially after some use, are found to deliver far less than the rated pump capacity, and attention must be given to valves, packing, leaks, etc. Sometimes restrictions in pipe lines and size or condition of hose or fittings, or use of nozzles with too small disks prevent discharge of pump capacity. Keep your pump efficient!

Pressure at nozzles of 350 pounds or more on power rigs has given finest break-up of spray fog and most economical coverage. Pressure of 600 pounds or more gives splendid coverage. High pressures are limited only by added power costs and ability of hose and equipment to withstand the higher pressure.

Many pressure gauges, especially the older ones, have been found inaccurate in the orchard.

There is a place for both single guns and multiple drive guns or brooms. Combinations of both are often effective, using the single gun for tree tops and where thorough coverage with brooms is difficult or impossible.

Since sprayers are purchased to put a needed number of gallons on trees in a given time, see that combinations of nozzles used permit efficient discharge of the rated capacity of spray pumps. See that the parts of nozzles that soon wear, such as disks and whirl plates, are changed for new ones as necessary. Worn out nozzles and a disk too large for the eddy chamber of the nozzle result in coarse, wasteful sprays.

STAUFFER SULPHUR FLASH

USE "MAGNETIC" CATALYTIC SULPHUR IN YOUR LEAD ARSENATE-LIME SULPHUR SPRAYS. THIS SAFENER, WHEN ADDED TO THIS SPRAY COMBINATION, PREVENTS THE FORMATION OF HARMFUL ARSENICAL COMPOUNDS AND BLACK LEAD SULPHIDE SLUDGE. INDICATIONS POINT TO HEAVY DEMAND. ADVISE PLACING YOUR ORDER WITH LOCAL STAUFFER DEALER NOW=

Stauffer Sulphurs give safe, sure control at the lowest possible cost. That's why more Stauffer Sulphur is used than all others. Check our list of sulphur products—there's a definite grade for every type of equipment and for every known insect and fungus controlled with sulphur.

"MAGNETIC-SPRAY" WETTABLE SULPHUR—The purest, effective wettable sulphur obtainable. 98.5% pure sulphur.

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"MAGNETIC" CATALYTIC SULPHUR—A safener for lime sulphur-lead arsenate spray combinations.

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"CROWN" BRAND WETTABLE SULPHUR—A superfine commercial flour sulphur to which 5% wetting agent has been added.

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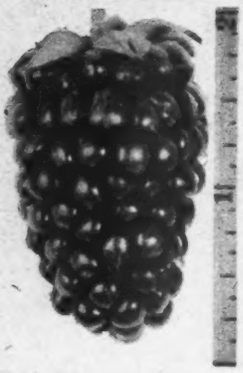
BOYSENBERRY



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RASPBERRY PESTS

(Continued from page 14)

Washington Experiment Station, resistant to mosaic and with desirable fruit characters. It was found that these seedlings escaped the mosaic because the insect responsible for the spread of the diseases would not attack these plants.

Commercial growers must be on guard to protect plantings by destroying infected plants as soon as noticed. Since at least one of the mosaics is much more destructive on blackcaps, to which it may be transferred from reds where the symptoms are often masked, plantings of reds and blacks must be separated by several hundred feet.

Raspberries are attacked by several insect enemies, most of which can be held in commercial control by sanitation in the patch. Possibly the raspberry mite, or, as it is commonly known, the red spider, is one of the most generally serious, causing severe foliage injury in hot, dry weather. Oil sprays, carefully applied, are usually effective in checking the mite. Experimental work now under way with other materials shows considerable promise. A breeding program to originate mite-resistant varieties is also in progress.

The concluding portion of Dr. A. S. Colby's article on raspberry cultural operations in the January issue and which was scheduled to appear this month will be published in the March issue.

HANDY GUIDES

Brimful of information on pruning fruit trees, also roses, flowers, shrubs, hedges, vines, evergreens, and shade trees, is the Disston Pruning Guide. Complete instructions for setting and filing saws, together with information as to how to choose and use the various tools featured, are contained in the Disston Saw, Tool and File Manual. Both booklets are obtainable without cost through AMERICAN FRUIT GROWER.

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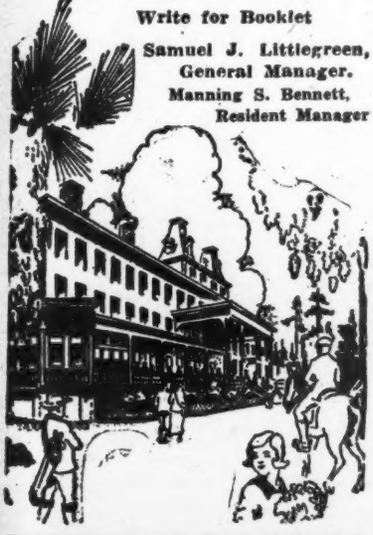

An active professional horticultural career covering more than 42 years was terminated recently when C. P. Close retired from his position as Senior Extension Horticulturist of the U.S.D.A. For 20 years Mr. Close had been connected with the U.S.D.A. and prior to this period served State agricultural colleges including Utah, Delaware, and Maryland.

CODLING MOTH AND APPLE PRODUCTION

(Continued from page 30)

appears remote. The axe, instead of the sprayer, would be desirable in this connection.

Elimination at its source of unrestricted moth development offers more promise than any other measure of attack. In view of the fact that government is aiding various struggling farm enterprises, it might be a fine idea to include in its program the payment to owners for the removal of non-commercial trees, many of which are poor varieties that tend to keep apple prices low and insects and diseases at a high level.

There appears to be little possibility that more effective spraying measures for codling moth control will be developed in the immediate future. Our spraying equipment is adequate. The sprays being employed are the best the scientist of today can devise. Doubtless some day someone will find a more effective measure of control. However, until that time arrives, more attention must be given to sanitary measures, the further elimination of abandoned and poorly cared for orchards, as well as the back yard unsprayed tree. The investigator can point the way, but he cannot put into practice measures of this sort. These improvements and benefits rest upon the shoulders of the growers themselves. Until the importance of this type of codling moth eradication is more thoroughly understood and put into practice, moth populations in many well cared for orchards and districts will remain high with a corresponding expensive spray program and more or less unsatisfactory control.

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Chromosomes of Nut Trees

TO THE layman chromosomes are rather mysterious bodies whose relation to practical horticulture is rather difficult to understand. A knowledge of chromosome structure and development in the different plants may, however, prove very useful to the fruit or nut grower as well as to the breeder of these plants. Relationships between the different species of a genus may be revealed by a study of their chromosomes. Sterilities or the failure of a variety to set fruit, or inability of certain species to cross with other species may likewise be explained. Much time and effort may be saved by the breeder or by the grower who is able to apply the available information concerning the chromosomes. For these reasons a paper by Dr. J. W. McKay of the U. S. D. A. on the chromosomes of some nut plants which was presented at the Washington meeting of the Northern Nut Growers Association may be of interest.

Following a description of their importance in plant growth, Dr. McKay pointed out that the number, size, shape, and other features of the individual chromosomes are characteristic for a species and are thus helpful in differentiating between species. This is especially true of chromosome number, since in the hickories, for example, as with many other genera, there is a series of higher chromosome numbers, all of which are multiples of a common base number.

Using the hickories for illustration, Dr. McKay discussed the part chromosomes play in hybridization work with nuts. Hickory species fall into two groups, one with 32 chromosomes and the other with 64. A hybrid resulting from the crossing of species from the two groups would have 48 chromosomes in all its cells. When the hybrid flowers the discrepancy in chromosome number and genetic content of the two sets would be so great as to result probably in the irregular distribution of the chromosomes in the formation of pollen grains and egg cells. In this manner very few of the germ cells of the hybrid are provided with a complete set of chromosomes and the plant thus forms very few flowers that can function and produce fruit. The cytologist is able to predict with reasonable certainty that crosses between certain species of hickory are likely to yield hybrids with varying degrees of sterility and consequent unfruitfulness.

Dr. McKay states in conclusion that "emphasis should be placed upon the reasons why a study of the chromosomes is of fundamental importance in nut production problems. In this group of plants the seed or embryo, not the fruit, forms the edible portion or the article of commerce. The seed develops to maturity only after the completion of a long series of reproductive processes, and since these processes are guided and determined by the behavior of the chromosomes, a knowledge of these internal phases of development is of basic importance in all problems involving fruitfulness of the tree."—G. L. SLATE, *Sec'y*, Northern Nut Growers Assn., Geneva, N. Y.

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NEW

- FRESH FRUIT SEEDER
- VINEYARD ANCHOR

By HANDY ANDY

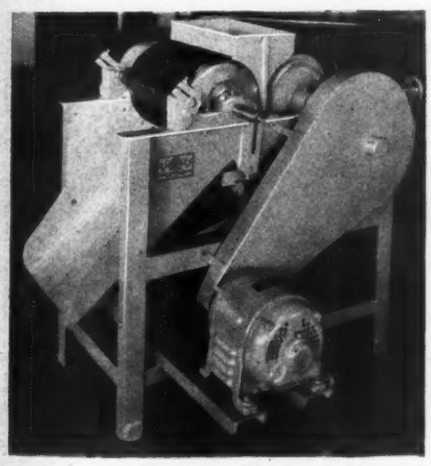
At a recent horticultural society meeting, a fruit grower told me that he believed one of the solutions for moving large crops is the expansion of by-products manufacturing, both by individual growers and large concerns. And I think he's right. There are many knotty questions which arise when considering by-products and from these questions come new ideas. I'd like to have your ideas on this important subject. The address is: AMERICAN FRUIT GROWER, 1370 Ontario Street, Cleveland, Ohio.

FRESH FRUIT SEEDER •

Of interest to growers who make by-products for sale at roadside stands or on regular markets is a new fresh fruit seeder for removing the seeds from fresh apricots, plums, cherries, prunes, dates, olives, and grapes.

This machine consists principally of rubber sawtooth rolls. Fruit is fed between the rolls. A knife on the underside scrapes off the seeds while "fingers" between each saw strip out the flesh of the fruit. This leaves the fruit in a whole condition.

To care for differences in the size of fruits, there are variable sized rolls. It is also possible to mount a



corrugated aluminum roll above the seeding mechanism to facilitate feeding when the smaller fruits are passed through the machine.

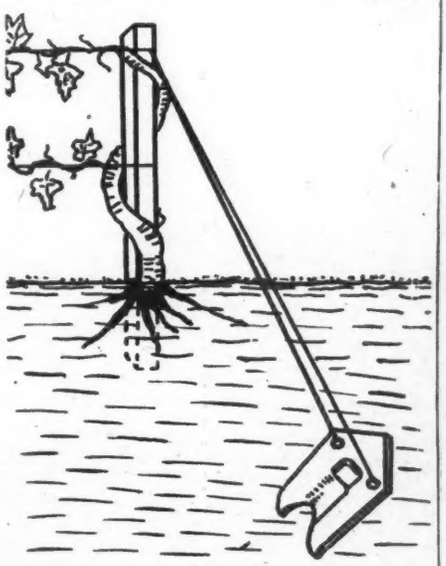
If jams or marmalades are to be made from the fruit, the machine can be equipped with slicing knives underneath the seeding mechanism to slice the fruit into strips. This eliminates the necessity of pulping.

For greater safety when using an auto trailer at night, I believe it's a good idea to have a tail light on the trailer, a practice which is compulsory in some states. This can be installed by using a double contact plug at the rear of the car. A double cord of sufficient length to reach the trailer tail light can be equipped with a double contact socket to fit into the plug on the car. A second-hand tail light can usually be easily obtained and installed.

VINEYARD ANCHOR •

Although the vineyard anchor has been used for some time by California grape growers, it may be new to many of our readers.

The anchor consists of a pointed metal plate with holes for attaching



wire. The anchor is driven into the ground by means of a drive rod after the wires have been attached to it. After the anchor is in place, wires are tightened to the end-posts of the trellis to provide a steady support. Manufacturers recommend that only No. 10 wire be used underground for best results.

The illustration above shows the anchor in place after it has been driven into the soil and the wires attached to the end-post. In addition to supporting the ends of trellises, it may often be desirable to use such a device as the vineyard anchor to lend support at the middle of long rows where the trellis has sagged.

A good practice I've just heard about is to slip pieces of old auto tires over the corners of disk, weed hog, harrow, and other implement frames to protect young trees from being skinned up. In most cases the pieces can be wired on the frame corners.

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Fig. 648 Less Drain Plug

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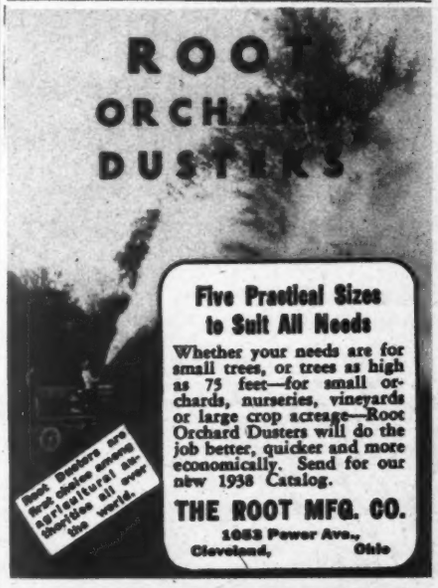

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SUCCESSFUL ORCHARDS

• A "ROUND TABLE" PAGE FOR EVERY GROWER •

This page is a place for growers to get together and exchange experiences and ideas. The beginner, as well as the veteran, will find here many practical suggestions for better and more profitable fruit growing. In return for the helps you receive from this page, be ready to pass on, for the benefit of others, any new idea, method or procedure you have developed or run across. Just jot it down as it occurs to you (a postcard will often do) and mail it to the "ROUND TABLE EDITOR," AMERICAN FRUIT GROWER. Don't worry about fancy writing. What the readers of this page want are practical pointers—that are to the point.

FLAT-HEADED BORERS REPELLED BY MIXTURE

ONE of the pests that has become increasingly troublesome to fruit growers in the past few years is the flat-headed apple tree borer. Adults of these borers lay eggs in the bark cracks of trees and the borers hatch from the eggs. To prevent this egg laying, Missouri fruit grower E. R. Gorton uses a prepared mixture. Read what he says about his method of repelling the egg-laying adults of the borers:

"In our orchards we have, for three years, excluded flat-headed borers with this mixture: 50 pounds of common laundry soap, three gallons of water, 25 pounds of flake naphthaline, and two pounds of flour.

"Soap is allowed to soak in water for a few days so it will become soft. A potash soap that will form a smooth mixture is used rather than a soda soap, since the latter becomes jelly-like. Add the flour and naphthaline and cook in a double boiler (which may be made by placing a small wash boiler in a larger one) until the mixture reaches 180 degrees F. At this temperature the naphthaline will have melted. Then cool the mixture, stirring occasionally.

"Applications were made with a paint brush every three weeks starting June 1. The trees were not injured by the mixture and no borers were found in the treated trees. In trees left as checks the borers were plentiful. We also believe the mixture may prevent the work of other borers."

But once a tree becomes infested with the borers, the only remedy is to cut or probe them out of their burrows. Read the item below for additional facts on this method of control.

GRAFTING WAX AIDS HEALING OF WOUNDS

HOW George N. Light, Iowa fruit grower, treated trees after cutting out borers is told in his letter, which follows.

"I have a Golden Delicious orchard in which the borers have been bad. This fall the borers were removed and the wounds cleaned out thoroughly. Then I made a good grafting wax by mixing beeswax, tallow and resin and applied it smoothly to the trees. The dirt was removed to the collar of the tree and thus a clean job was assured. The trees were then wrapped with heavy tar paper.

"My purpose in writing this letter is that I believe you may care to help someone else by passing on to them this method of using grafting wax. I know that it will work fine on apple trees, for I have experimented with it for several years and have saved a great many trees. Wounds will heal because water and air are kept away from them. They heal gradually by making small, globular nodules."

Mr. Light's letter was forwarded to the "Round Table" page by R. M. Clark, president of the Iowa Fruit Growers Association.

Knox McEwen looks over one of his five-year-old Golden Delicious trees that was badly damaged by fire blight in 1935, but revived to produce almost four bushels of fancy apples last fall.

RECORD GROWTH IN ALABAMA ORCHARD

"TWENTY acres of our orchard," says Knox McEwen, Alabama fruit producer, "are situated in a filled-in loam bottom which until a few years ago was a typical gum swamp, so dense that the soil had not seen the sun for some 40 to 50 years. I have 800 Starking and Golden Delicious trees one to three years old in this bottom land and 500 of the same varieties five years old on my upland cotton land. The largest two and three-year-old Starking and Golden Delicious trees in the country are in this rich loam bottom.

"I claim an all-American record for my five-year-old Golden Delicious trees on the upland soil. Last fall they produced 321 fine apples which picked three and three-quarter standard bushel boxes (two boxes of which were extra fancy and I sold them for $2 a box).

"My Starking trees in the rich loam bottom are 14 to 15 feet high and their tops are from 10 to 12 feet in diameter. I would like to know if anyone else has such growth on three-year-old Starking trees because I think this is just about a record. And my two-year-old Golden Delicious trees are 10 to 12 feet high and bore one to four apples each this year.

"If any fruit growers are interested in my project I will be glad to have them visit me at any time."

Mr. McEwen has had experience with trees on both upland and bottom soils and it looks like he has produced some record trees. If any of our readers have had similar experiences, let's hear from you.

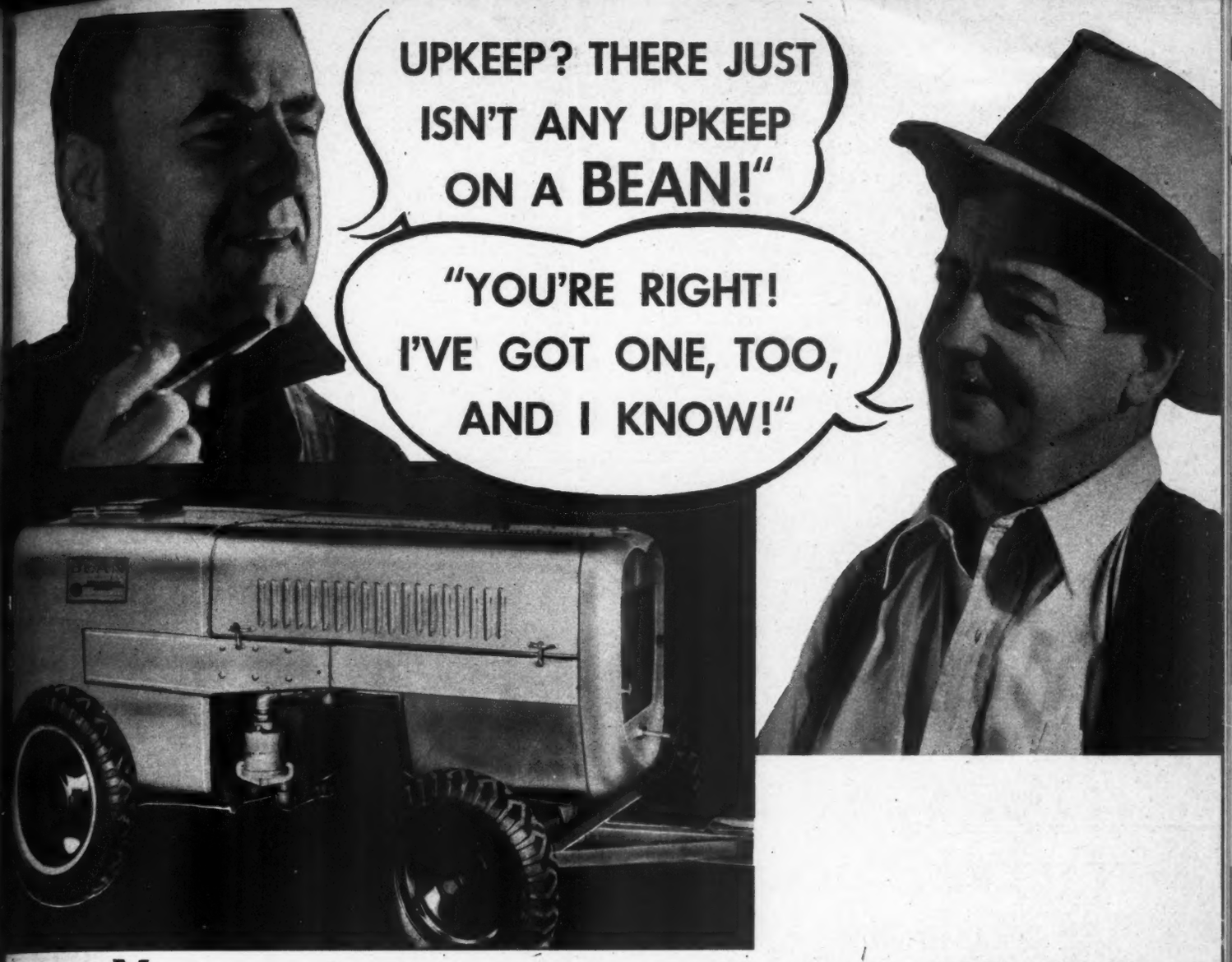
SPRAY RING SPEEDS CONTROL OF PESTS

WITH the statement that "I have sprayed my small orchard for 30 years," Ernest D. Wheeler, veteran Wisconsin fruit enthusiast, prefixes his remarks on the benefit of the spray ring. He continues:

"My neighbors wanted to form a spray ring and I joined it. The advantage to the small orchardist is that the spray man comes when most of the trees are right to spray, while the individual often puts it off for other work and the spraying is not done on time. I first used a barrel and hand pump for spraying. In 1937 my trees were sprayed three times for worms, and I also used a homemade electric trap.

"I made the trap by placing a 100-watt bulb in a hole in the middle of a small board fence built over a tub filled with water. The light brings codling moths and June bugs to it like a swarm of bees, and they fall into the water as they hit the fence. I scoop them out of the water and feed them to my chickens for meat. The three sprays and the trap resulted in 90 per cent worm-free fruit from my three-acre orchard."

In localities having many small orchards, such as Mr. Wheeler's, the value of a well-maintained spray ring operated by an efficient sprayman is firmly established.



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